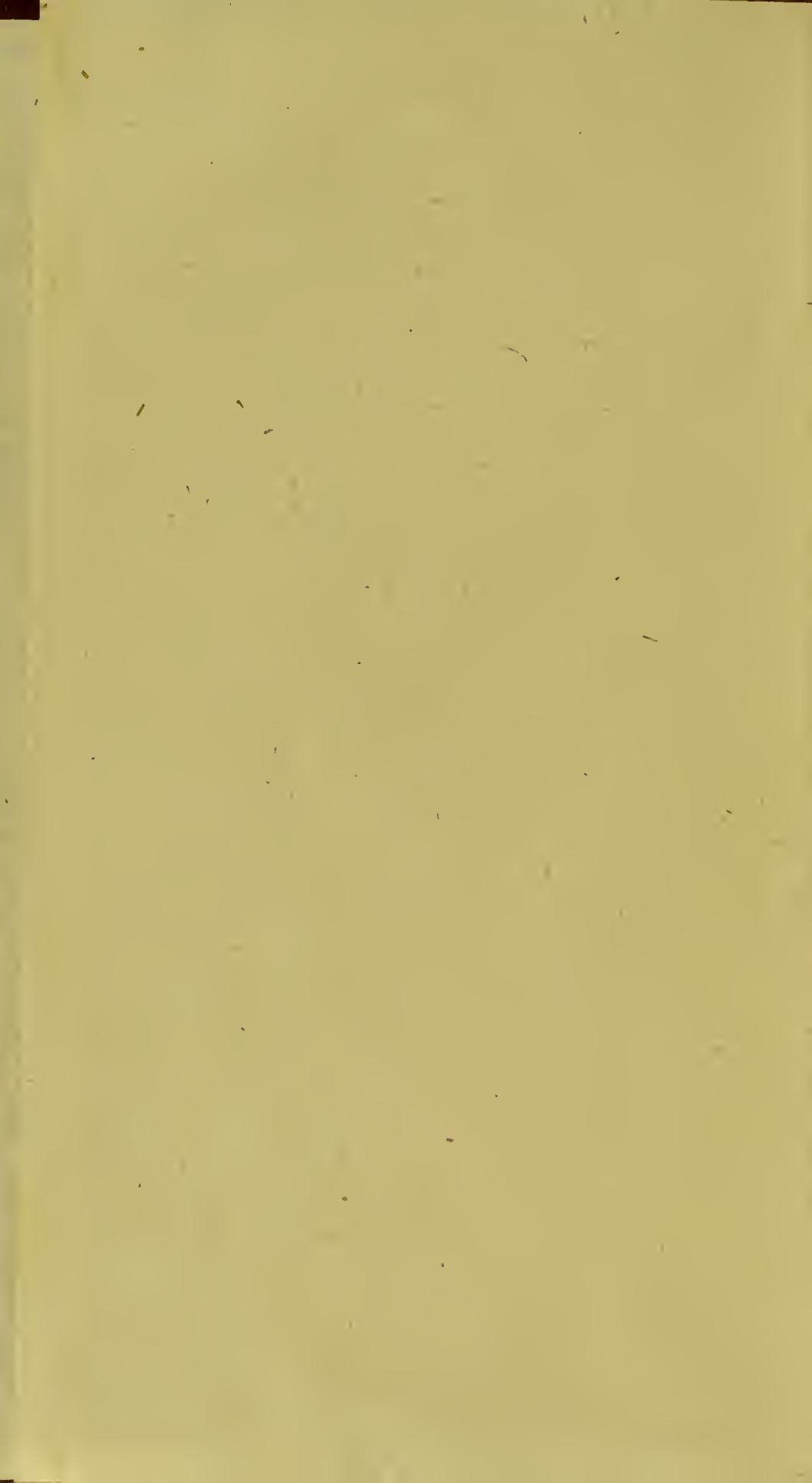
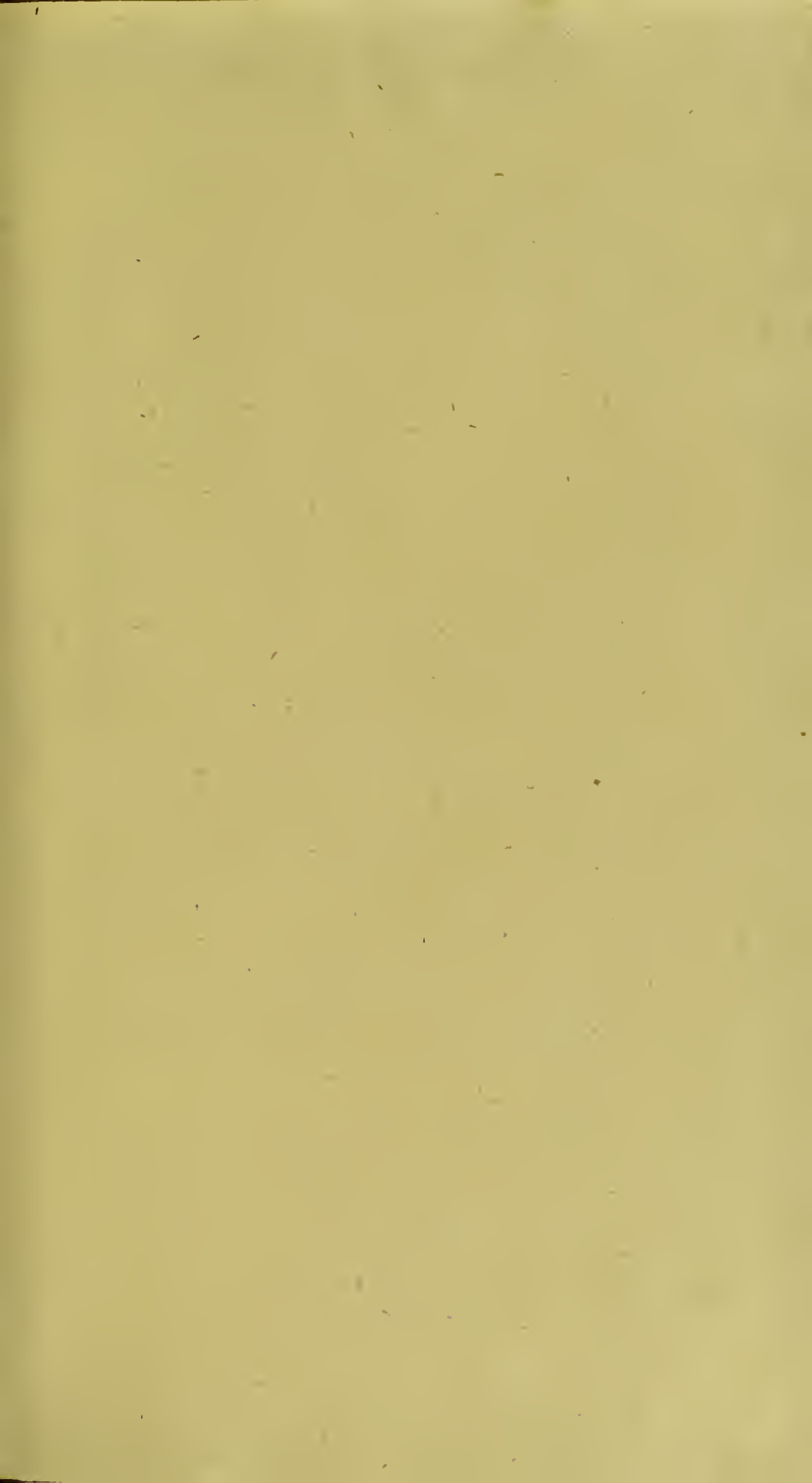


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*Raeburn Pinx. Edinburgh.*

*W. & J. Walker sc. Lond.*

Benjamin Bell, Surgeon,  
Edinburgh.

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O F  
S U R G E R Y :

BY  
BENJAMIN BELL,  
MEMBER OF THE ROYAL COLLEGES OF SURGEONS  
OF IRELAND AND EDINBURGH,  
ONE OF THE SURGEONS TO THE ROYAL INFIRMARY,  
AND FELLOW OF THE ROYAL SOCIETY  
OF EDINBURGH.

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*ILLUSTRATED WITH COPPERPLATES.*

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VOLUME I.  
  
THE SIXTH EDITION,  
  
CORRECTED AND ENLARGED.

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EDINBURGH:  
PRINTED FOR BELL & BRADFUTE;  
AND G. G. & J. ROBINSON, AND  
MURRAY & HIGHLEY, LONDON.

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MDCCCXCVI.





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# P R E F A C E

TO THE

SIXTH EDITION.

I HAVE reason to hope, that this, the sixth edition of my System of Surgery, will be found considerably improved: I have been at pains to insert in it all such real improvements as have been made in Surgery since the first editions of this work were published; and to give representations of such useful instruments as have been invented during that period.

It is also my intention, still to keep these objects in view, and to incorporate in such future editions as may be called for, all such improvements as may come to my knowledge.

I must beg leave, however, to observe, that I do not engage to notice all that may be mentioned to me as improvements, or



that authors may judge proper to publish: For not having done so, I have already indeed been pointedly blamed: But authors should recollect, that with whatever partiality they may view their own productions, and those improvements which they themselves or their friends may bring forth, that others may not value them so highly.

Anxious to avoid controversial writing, in which, a full occupation of my time, in what I judge to be more useful pursuits, does not permit me to engage, and to which my inclination is altogether adverse, nothing shall tempt me to give way to it. This remark I am induced to suggest, from being informed, that some have written in such a manner on different parts of my publications, as if they wished and expected that I should reply to them: Books of this description, however, for the reasons I have given, I shall never read; but I shall be pleased to learn, that the labours of those who have written them are not entirely lost, and that they derive the satisfaction  
of

P R E F A C E.

Y

of proving useful, by pointing out to others such errors as I may have fallen into. Not doubting, that every work must rise or fall according to its merit, I shall continue, as I have hitherto done, without regard to the opinions of individuals, to detail, what, from experience and observation, I judge to be the best practice, and to state my opinions clearly and decidedly; but, without endeavouring to force these opinions upon others, I shall leave it to the Public to determine, whether these, or those of other men, submitted to their consideration, ought to be followed.

In speaking of the late improvements in Surgery, I have elsewhere observed, what may here with propriety be repeated, that were I to endeavour to trace all that have been proposed within these last fifty or sixty years, I should often find it difficult, and in some instances impossible to determine, by whom the practice as now established was introduced; and in order to give a fair account of the progress of the different operations of Surgery, from their rude to their improved state,

state, I should be under the necessity of entering upon a full chronological history of each: While this kind of inquiry could serve no useful purpose, it would tend to render more prolix, a work which, from the variety of its objects, must necessarily extend to a great length: I shall, therefore, in general, decline it: When the author, however, of any remarkable improvement is with certainty known, I shall never fail to give him all the credit which his discovery seems to merit: but to notice every inconsiderable alteration that may be proposed upon operations, and to enumerate the opinions contained in many publications, often the effusions of men of no practice or observation, as it could tend to no utility, it will not therefore be attempted.

I have also formerly remarked, that I wish every where to avoid theoretical disquisitions: When the subject under consideration can be rendered more clear and intelligible, I have occasionally employed such reasoning as experience and com-  
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mon sense seem evidently to support; but I have studiously guarded against the discussion of doubtful speculative opinions: In addition to this I may observe, in the words of a celebrated German practitioner, that I have carefully avoided general maxims: In no science, he observes, does self-sufficiency, or bold and general assertions, and decided axioms, more certainly mark ignorance and want of experience than in the Science of Medicine\*. Inasmuch, that in whatever publication they abound, there is much cause to suspect, that the author has not enjoyed those full opportunities of observing the progress of diseases, and the numberless varieties that they assume, which every man ought to have done before he attempts to give information to others.

To this publication it has been objected, that it is too minute, and of course too extensive. But it must be recollected, that it is chiefly written for those who are learning, or who are yet young in

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\* Aug. Gottlieb Richter, M. D.

the profession of Surgery, and not so much for men of experience, who alone have stated this objection, and who in this instance seem to have forgot the steps by which they themselves gained the knowledge which they possess, or that they ever required assistance in the more early part of their chirurgical pursuits. It was a want of this kind of assistance, when I entered on the study and practice of Surgery, and which at that time was generally felt and complained of, that first suggested to me the propriety of publishing this work ; and if it shall continue to afford to the younger part of the profession, what I have reason to hope it has hitherto done, an easier method than they formerly possessed, of acquiring knowledge in the practical part of Surgery, and of the principles on which it is founded, I shall not be disposed, from the remarks of a few, to alter the manner in which it is written. At some future period, I, or my son, now engaged in the same profession, may give an abridgement of the whole, which may serve as a manual or directory,  
for



for those occupied in the line of surgical operations ; but the concise description of an abridged work, would be ill calculated for those who have seen nothing, and who have therefore all to learn.

In this edition, a considerable change will be perceived in the arrangement of the subjects ; and the volume on Inflammation and Ulcers, formerly published separately, now makes part of the present work. At the end of every volume are inserted the Plates which more particularly belong to it ; and a list of the whole Plates is given immediately after the Contents of each, by which any particular Plate may be readily found. A General Index is also subjoined to the last volume.

To prevent inconvenience or unnecessary expence to the purchasers of former editions, I propose, so soon as I can get it done, to collect and publish in a separate volume, all such parts of the present edition as are new, and to subjoin the additional

additional Plates, and a General Index for the former editions.

With a view to illustrate this work, and to give me an opportunity of adverting more particularly than can be done in a general system, to many of the more important parts of Surgery, I have, for many years past, been occasionally employed in arranging for the press, narrations of such accidents and diseases, in the management of which I have been personally concerned, as I conceive will answer this purpose; and they will be judged to be the more valuable, as a great proportion of all that I shall select will relate to circumstances, in which I have had occasion to act on consultation with other practitioners. Two volumes of this kind, I have reason to think, will be ready in the course of the ensuing year, and they will be published under the title of CONSULTATIONS and OBSERVATIONS on many of the more important Parts of Surgery.

EDINBURGH, }  
Dec. 1. 1795. }



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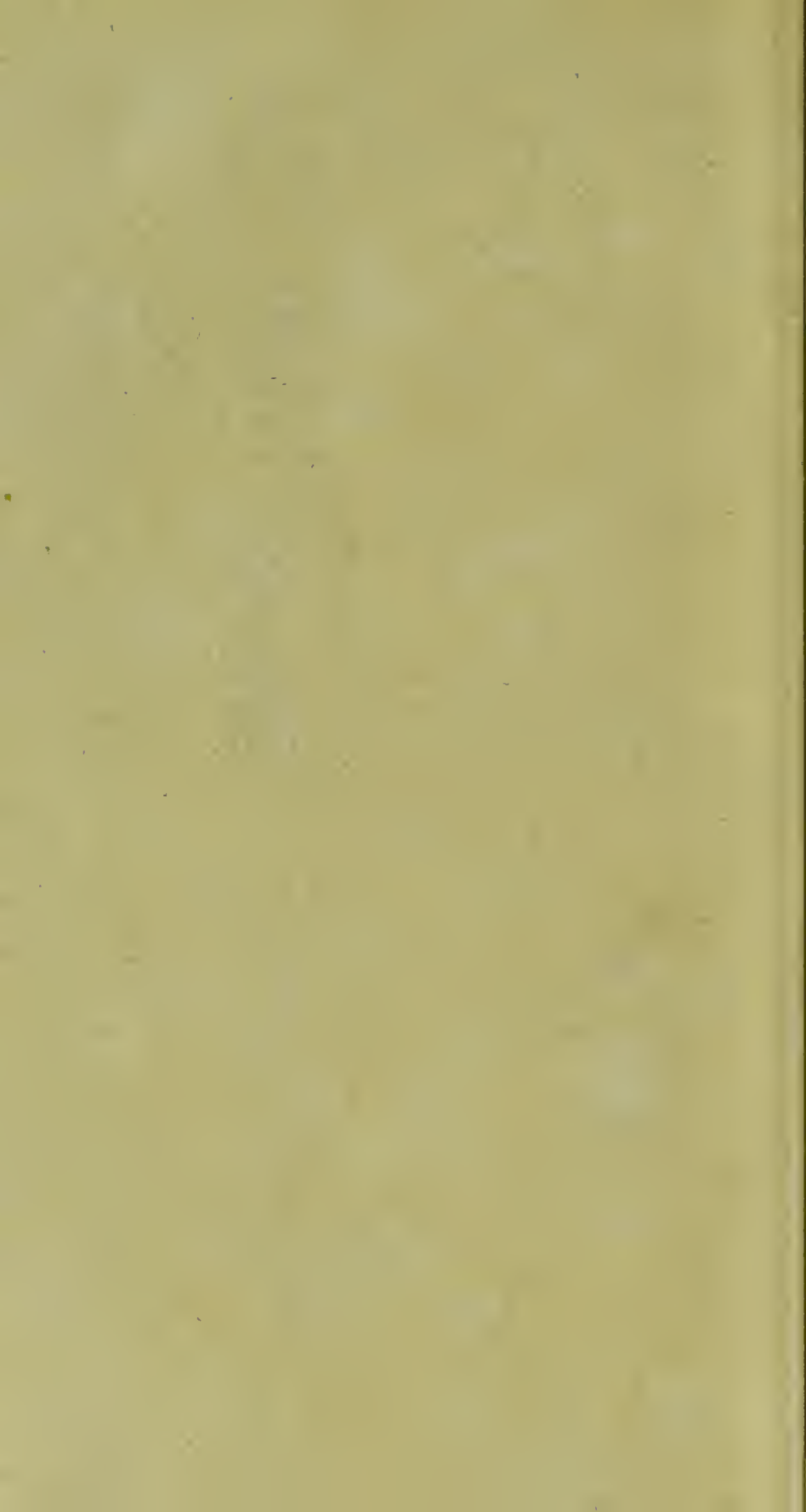
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CHAPTER I.  
ON INFLAMMATION.

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SECTION I.

*Of the Symptoms and Causes of Inflammation.*

---

§ 1. *General Remarks on Inflammation.*

**I**NFLAMMATION is the most frequent, as it is perhaps the most important object of the Surgeon's attention. We daily meet with it as the consequence of operations, and in the treatment of Wounds, Contusions, and Ulcers. It is therefore

VOL. I.                      B                      considered

considered as a fit subject for the first article of a System of Surgery.

Every organised part of the body is liable to inflame, but as the inflammation of internal parts is generally productive of symptoms which more properly fall within the province of Medicine, it would here be foreign to our purpose to enter upon the discussion of these. We shall therefore consider this symptom, and its various consequences, as they most frequently occur externally; and as all the phenomena of inflammation will be understood from the consideration of phlegmon, or local inflammation, any observations to be offered shall be more particularly confined to that variety of the disease.

§ 2. *Of the Symptoms and Terminations of Phlegmon.*

PHLEGMON is a term which we apply to a circumscribed tumor, attended with heat, redness, tension, and a throbbing pain. These are the first appearances of phlegmon ;

phlegmon; and when they are slight, and the part affected of no great extent, they have frequently no apparent influence on the general system. But, when more considerable, and the inflammation extensive, the pulse becomes quick, full, and generally hard; and at the same time, the patient complains of universal heat, thirst, and other symptoms of fever.

If, either by an effort of nature, or by the application of proper remedies, the pain, heat, and tension are removed, the other symptoms we have mentioned, and which in a great measure or altogether depended on these, likewise abate, and the patient soon gets well. This is reckoned the first, and is generally the most desirable manner in which inflammation terminates, and is termed Resolution.

If, however, the several symptoms of heat, pain, and redness, instead of diminishing, rather increase; if the febrile symptoms are likewise augmented, and the tumor gradually acquires a larger size, turns soft, somewhat prominent in

the middle, or towards its most depending part, gets a clear shining appearance, and becomes less painful; the different symptoms of fever then abate, and a fluid, upon pressure, is found to fluctuate underneath. In this manner inflammation is said to terminate in what is termed Suppuration.

But if the pain, redness, and tension of the part increase, while the fulness of pulse and other febrile symptoms are augmented, at the same time that there is little change in the tumor in point of size, there is then much reason to suspect that Gangrene or Mortification will ensue.

Mortification first appears by a change of colour in the part affected, which, from being of a bright red, comes to acquire a leaden or livid cast, while small vesicles, containing a thin acrid serum, are dispersed over its surface—the pain abates—the pulse sinks, but continues frequent—the tumor at last loses its tenseness—turns black and flaccid—and thus terminates in a real mortified or dead spot.

These



These are the several ordinary consequences of inflammation. We shall now proceed to treat of the various causes of the disease, and lastly of the method of cure.

§ 3. *Of the exciting and predisposing Causes of Inflammation.*

THE exciting causes of inflammation, are in general whatever tend to stimulate, or produce pain and irritation: Such as, all variety of wounds, whether simple, lacerated, or punctured, and with whatever instrument they may be produced—also bruises and burns, whether by the actual or potential cautery—likewise all corrosive and irritating applications, as, the different strong acids, cantharides, and all the class of rubefacientia. Ligatures may likewise be mentioned, and tumors that act as ligatures by producing an undue compression on any of the blood vessels and nerves; as also, violent exercise of any particular member, and cold applied to a particular part.

These are the most common external causes of phlegmon : but there are others which tend to produce the same effect, which we are to consider entirely as internal ; such are the different vitiated states of the fluids, excited by the presence of morbid matters of different kinds, as the matter of Lues Venerea, Small Pox, Measles, and Scrophula. Fevers too that end in critical inflammation and consequent abscesses, seem likewise to act in the same manner.

Under one or other of these heads are comprehended almost all the exciting causes of inflammation. It is not improper, however, here to observe, that there are other causes, which, with propriety, may be said to be of the predisposing kind, by tending to produce such a state of the system, as renders it more susceptible of inflammatory complaints than it naturally would be. The most remarkable of these is, a full plethoric habit of body, induced either by a very nourishing diet, or want of exercise ; or, perhaps, by a combination

tion of both. We also observe, that inflammatory diseases are more frequent in young than in old people, and in men more than in women.

§ 4. *Of the proximate Cause of Inflammation.*

VARIOUS opinions have prevailed on the proximate cause of inflammation: some of which have never been generally admitted, and others, after having prevailed for a time, have at last too been rejected.

The doctrine on this subject, which for some years has prevailed in this University, as it readily accounts for the action of the several exciting causes of inflammation, for the effects of the disease, and for the operation of the medicines employed in the cure, appears most clearly to explain the proximate cause of all inflammatory affections.

From observing the different phænomena which occur in inflammation, an increased action of the vessels of the part affected seems in every case evidently to take

place; and as, from an increased action in the arteries of a part, all the circumstances of inflammation are explained, we are hence induced to consider this state of the vessels as the proximate cause of the disorder.

This opinion, as we have already observed, is greatly supported by a review of the several exciting causes of inflammation; which being in general of an irritating or stimulating nature, their application to living or sensible parts, must of course be productive of a preternatural exertion of the vessels in such parts. Thus, to reason from analogy, we observe, that sternutatories applied to the internal membrane of the nose—the aliments to the stomach and intestines—and the blood to the internal surface of the vessels in which it is contained, all serve as so many stimulants to action in these different parts; and in the same manner, corrosive or other irritating substances, when applied to the coats of the arteries, naturally in them produce the

the same effects as in other muscular organs.

We thus in a very probable manner account for the action of all direct stimulants in the production of inflammation. It frequently happens, however, that inflammation takes place when the application of stimulants, or irritating substances, cannot in any degree be suspected. In such cases, the increased action of the arteries and of the heart when it occurs, seems to be supported by a spasm or constriction of the extreme vessels, either of a particular part, or of the general system. And hence, from the known tonic or astringent power of cold, we account for the frequent occurrence of inflammatory affections in our cold seasons of winter and spring; and hence, too, the throat and lungs are more especially subject to disorders attended with inflammation, from these parts being more particularly liable to the immediate action of cold.

Dr Cullen, who considered spasm as the sole proximate cause of inflammation, when  
treating



treating of this subject, says, "That a spasm of the extreme vessels takes place in inflammation, is presumed from what is at the same time the state of the whole arterial system. In all considerable inflammations, though arising in one part only, an affection is communicated to the whole system; in consequence of which, an inflammation is readily produced in other parts besides that first affected. This general affection is well known to physicians, under the name of *Diatheſis Phlogiſtica*. It most commonly appears in persons of the most rigid fibres; is often manifestly induced by the tonic or astringent power of cold; is increased by all tonic and stimulant powers applied to the body; is always attended by a hardness of the pulse; and is most effectually taken off by the relaxing power of blood-letting. From these circumstances, it is probable, that the diathesis phlogistica consists in an increased tone, or contractility, and perhaps contraction,

traction, of the muscular fibres of the whole arterial system \*.”

An increased action in the vessels of a part, being admitted as the proximate cause of inflammation, we can pretty certainly account for the operation of the several predisposing causes ; and upon the same supposition may be explained the different symptoms which occur in the course of the disorder.

Thus the increased action of an artery, by forcing or propelling into the smaller sets of vessels, red globules, and other dense parts of the blood which they cannot easily transmit, very readily accounts for the redness, tumor, tension, and throbbing pain, which occur in every case of phlegmon: As likewise, in some measure, for the augmentation of heat, which increased attrition must in such cases always produce. It is probable, however, that the accumulation of animal heat alone, which must necessarily arise from a larger proportion of blood being sent to a part than it naturally

\* See First Lines of the Practice of Physic, p. 88.



rally receives, will have a considerable influence in the production of an increased degree of heat.

The method of cure, as we have already observed, tends also to confirm the general doctrine we have given of the cause. Thus the most effectual remedies, in almost every case of inflammation, are exactly such as would be recommended for the removal of an increased tone in any particular part, were we convinced that this alone was the disease, *viz.* A low diet, blood-letting, and other weakening evacuations, together with emollient sedative applications: but this, when we come to speak more particularly of the different remedies, will more fully appear.

In almost every case of external inflammation, except, perhaps, when it is very extensive, and runs deep, and the different symptoms are all violent, we may venture upon a favourable prognosis. For, if Resolution, which is the easiest and most desirable termination, is not effected, Suppuration will most readily be the consequence ;

quence ; and the danger occurring from this, when the constitution is otherwise healthy, is not commonly very material.

When, however, the inflamed part is of considerable extent, while the different local and general symptoms of fever at the same time are violent, a good deal of danger is to be dreaded. For, besides the risk to the constitution from the fever itself, if the symptoms continue high for any length of time, without showing some tendency either to Resolution or Suppuration, Gangrene will, in such circumstances, probably follow ; and in what manner this may terminate, is always uncertain.

## SECTION II.

*Of the Treatment of Inflammation by Resolution.*

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§ I. *Resolution of inflamed Tumors, in some instances, not to be attempted.*

**I**N the treatment of phlegmon, we ought, in general, to have it in view to accomplish a cure by resolution. Some exceptions, however, occur to this, in which the removal of inflammatory tumors by resolution ought not to be attempted.

Thus, tumors succeeding to fevers, and other internal disorders, ought always to be brought to suppuration; for nature in that way pointing out an exit for some superabundance of fluids existing in the system, it might probably be productive of hazard to give her any interruption. It is, on the contrary, indeed, in all such cases

cases the safest practice to assist her as much as possible, by the use of such applications as will most readily bring the swelling to suppuration.

There are other tumors again, proceeding from an internal cause too, in which it is perhaps best to do nothing either with a view to resolve or suppurate: Thus, in swellings proceeding from scrophula, it might be dangerous to make use of repellent applications, at the same time that it is not often adviseable to promote their suppuration, from the cure of the sores which succeed to this proving always tedious and uncertain; and such swellings, it is well known, may remain for a great length of time, without any sort of risk to the patient; so that, in general, we think it most prudent never to meddle with them.

In Lues Venerea too, as we are possessed of almost a certain antidote for the disorder; and as buboes, and other inflammatory swellings that occur in it, are commonly, when opened, exceedingly troublesome,  
and

and very difficult of cure ; it is perhaps, for these reasons, the best practice to remove them by discussion : And this more especially, as their being brought to suppuration, can by no means free the patient from the disease ; but leaves him, on the contrary, under the same necessity of undergoing a mercurial course, as if no evacuation from the tumor had taken place.

In cases of Erysipelas likewise, which is a variety of inflammation, but which is easily distinguished from real phlegmon, by the colour of the inflamed part not being of such a bright red, but having a more dark copper-like appearance ; and by the swelling that occurs in it, not rising evidently into a tumor, but being rather diffused, and ending as it were imperceptibly upon the surrounding parts, we should always endeavour to remove the disease by discussion ; as, when swellings of this nature suppurate, they seldom either afford good pus, or heal kindly when opened.

Hence

Hence it appears, that with a few exceptions, it is the best practice to endeavour to remove inflamminatory tumors by resolution:

§ 2. *Of the Remedies to be employed for the Resolution of an inflamed Part.*

IN the incipient state of phlegmon, when the symptoms are not so violent as to affect the general system, topical remedies alone, with a due attention to regimen, often prove successful. But when, on the contrary, the inflammation runs high, and accompanied with general symptoms of fever, it then becomes necessary at the same time to pay attention to these.

In almost every case of phlegmon, it has been the prevailing practice to employ warm fomentations and cataplasms; but, as warm emollient applications have the most powerful influence in promoting sup-  
 puration, as will be shewn more particu-



larly hereafter, the use of such remedies, while the resolution of swellings is practicable, must necessarily be improper.

In the treatment of phlegmon by resolution, the first circumstance requiring attention, is the removal of the exciting causes of the disease; such as, extraneous bodies in wounds; pieces of fractured bones; luxations; and, in short, whatever may appear to have influence in exciting pain or irritation.

Of the various applications usually employed for inflammation, those of a sedative nature are chiefly to be depended on; and, next to these, emollients.

Of the former kind, may be considered all the different preparations of lead dissolved in vinegar; and it is presumed too, that the vegetable acid, by itself, likewise acts as a sedative.

As emollients, the bland expressed oils are often used with advantage; as also ointments of a soft consistence, made with any of these and pure wax.



§ 3. *Remarks on the Preparations of Lead, and other sedative Applications.*

In speaking of sedative applications for external inflammation, it will not be understood that I mean to recommend indiscriminately the whole class of medicines which in different circumstances are found to be of this nature. Thus, opium, though one of the most powerful of all sedatives, yet, as its external application to the human body is usually attended with some degree of irritation, however useful it may at times have been found in some variety of inflammatory affections, it will never probably, as an external application, be generally admitted.

Warm emolient fomentations, too, though they no doubt, act powerfully as sedatives, as tending, from their nature, more effectually to remove tension and pain, than perhaps any other remedy, yet, from much experience of their effects, in local inflammation, I have long been con-

vinced, when the resolution of inflamed tumors is wished for, that such applications very commonly do harm: For, in general, they either tend to promote supuration, or when long continued, are apt to induce such a relaxed state of the parts, as renders the thorough removal of the tumor always tedious.

No such reasons, however, have occurred against the preparations of lead. On the contrary, we may affirm, that while they may be used with perfect safety, they prove also much more powerful as discutients than any other remedy with which we are acquainted.

We are induced to suppose, that the preparations of lead act chiefly as sedatives, not only from their effects upon the stomach, which appear all to be of a sedative tendency; but from their immediate and obvious operation when applied externally to an inflamed part: which, when the preparation is of a proper strength, is almost constantly an abatement of the different symptoms of pain and  
tension,

tenſion, at the ſame time that an agreeable ſoothing ſenſation is communicated to all the parts to which they are applied.

Mr Goulard, in his diſſertation upon the external uſe of the preparations of lead, recommends them as almoſt equally proper in every ſtage of inflammation. Even when tumors have come to full ſupuration, a proper uſe, he ſays, of his *Extractum Saturni*, not by its repelling quality, for he will not allow it to be poſſeſſed of ſuch, but by its occaſioning an exudation of the contained matter, renders it almoſt always unneceſſary, he ſays, to open them.

He likewiſe mentions the ſame remedy as a proper application in gangrene. From my own experience, however, of the preparations of lead, I cannot take upon me to recommend them in either of theſe caſes. I have, indeed, made trial of them in gangrenous caſes, but without any evident effects being produced by them : and, however ſtrongly they may be recom-

mended by Mr Goulard, in the cure of abscesses, or collections of completely formed pus, I must own, that, in this state of the disease, I never thought of employing them. So that it is in the real inflammatory state of the complaint only, and while a cure by discussion may still be expected, that such applications are here meant to be advised.

From the known deliterious effects of lead, when taken into the system, an objection has, by some authors, been raised against a free use of the preparations of lead, even when externally applied.

That lead, in different forms, has, on being taken into the stomach, frequently proved poisonous, there is no reason to doubt; and that, in some particular instances, disagreeable symptoms have occurred, where some of the preparations of lead have been externally used, is also perhaps certain. That such bad symptoms, however, if they were not merely accidental, or produced by other causes, are, at least in general, very rare effects of the remedy in question,

question, I can venture, I think, certainly to affirm. For in all the experience which I have had of the external application of the preparations of lead, and in many cases, particularly of burns, I have known the greatest part of the whole surface of the body covered with them for days, nay, even for weeks together, I do not recollect an instance of any disagreeable symptom being produced by them.

Of all the preparations of lead for external use, *Saccharum Saturni*, or *Cerussa Acetata*, as it is now termed, is perhaps the best, as it has all the advantages of the others ; while, in it the exact strength of the preparation is more certainly ascertained. For although in the *Extrait de Saturn* of Goulard, as likewise in the *Acetum Lythargirites* of our Dispensatories, which are both, it may be observed, very nearly the same, we may be very certain of the quantity of lead employed to the vinegar ; yet we can never, but by crystallisation, know exactly, or even nearly, how much of the lead the menstruum may have dis-



solved, as this must depend upon different circumstances, and particularly on the strength of the acid, and exact degree of heat that may be employed; which are points, we may observe, not always in our power exactly to regulate. For these reasons, therefore, the salt, or sugar of lead, as it is called, should be always preferred, when it can be procured in an unadulterated state; but, as of late it has often been found mixed with chalk, and other substances not soluble in water, I have elsewhere had occasion to remark, that till this abuse is obviated, the *Acetum Lythbargiri* will necessarily be preferred.

The best mode of applying the remedy, seems to be in the form of a watery solution; for the preparation of which, the following proportions are, for general use, found to answer:

Rx. Sacchar. saturn. unc. fs.

Solve in acet. pur. unc. iv.

Et adde aq. fontan. destillat. lb. ii.

The addition of vinegar renders the solution much more complete than it otherwise

wife would be ; and without it, indeed, when such a large proportion of the lead is used, a considerable part of it commonly separates and falls to the bottom.

This is the form which I commonly employ for the use of this remedy ; but as Goulard's extract and water are preferred by many, I think it right to mention his method of preparing them.—The extract is prepared as follows :

To each quart, containing thirty-two ounces, of French wine-vinegar, add one pound of litharge of gold. Put them into a glazed earthen vessel, and let them simmer for an hour, or an hour and a quarter, upon a gentle fire, taking care to stir them during the ebullition with a wooden spatula : The vessel is now to be removed from the fire ; and the fæces being allowed to subside, the liquor upon the top must be poured into bottles for use.

The water used by Mr Goulard, which he terms the *Vegeto-mineral water*, is prepared by adding two tea-spoonfuls, which he specifies to be one hundred drops, of this



this extract, to a quart of water, and four tea-spoonfuls of brandy. The quantity of the extract and brandy to be diminished or increased according to the nature of the disorder, or degree of sensibility in the part affected.

In making use of either of these solutions, as it is of consequence to have the parts affected kept constantly moist, cataplasms prepared with them and crumb of bread, in general answer that intention exceedingly well. But, when the inflamed part is so tender and painful as not easily to bear the weight of a poultice, a circumstance by no means uncommon, pieces of soft linen, moistened with the solution, answer the purpose tolerably well: Although, when this objection to the use of cataplasms does not occur, as they retain the moisture longer, they should always be preferred. These applications should be always made when cold, or at least with no greater warmth than is merely necessary for preventing pain or uneasiness; they should be kept almost constantly

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ly at the part, and renewed always before turning hard.

Among the remedies recommended for external use in cases of inflammation, we mentioned Emollients. These, when the tension and irritation on the skin are considerable, prove often serviceable: the parts affected, being, in this state of the disease, gently rubbed over with any of the mild expressed oils two or three times a-day, the tension, irritation, and pain, are thereby much relieved, and the discussion of the tumor thereby greatly promoted.

In every case of inflammation, indeed, emollient applications would afford relief. But as the preparations of lead prove still more effectual, and as unguents of every kind tend considerably to blunt the action of lead; these two sets of remedies should never be combined: Nor should emollients be ever prescribed, but when irritation, tension, or pain, are so considerable as to render their application indispensable.

When parts affected with inflammation are not very tender, and especially when  
they

they lie deep, the application of the vegetable acid is often employed with advantage; and the best form of using it is in cataplasms, made with the strongest vinegar and crumb of bread. In such cases, too, I have sometimes found, that an alternate use of this remedy, with the saturnine solution already pointed out, has produced more beneficial effects, than we commonly derive from the continued use of any one of them.

At the same time that these applications are continued, bleeding with leeches, or cupping and scarifying as near as possible to the part affected, proves generally useful, and, in no case of local inflammation, should ever be omitted. In all such cases, the whole body, and more especially the diseased part, should be preserved as free as possible from every kind of motion: The patient should be kept upon a cooling regimen, and should abstain entirely from the use of wine and spirits.

In all the slighter degrees of inflammation, a due perseverance in the remedies

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we have mentioned, will, in general, be found sufficient. But, when the pulse is quick, full, or hard, and accompanied with other symptoms of fever, general blood-letting ought never to be omitted; the quantity to be determined by the violence of the disorder, age, and strength of the patient. The use of gentle laxatives, too, together with cooling diaphoretics, prove in such circumstances very commonly useful.

These evacuations being premised, we ought to endeavour to procure ease and rest to the patient; which in the treatment of every inflammatory tumor is an object of the first importance. Where the patient is deprived of natural rest, and in all cases accompanied with pain and irritation, opium is the remedy upon which alone we can place dependence. In large wounds, especially after amputations and other capital operations; in punctures of all kinds too; large doses of opium very commonly prove useful. In all such cases, however, opium, in order  
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to have a proper influence, must be given in full doses : otherwise it often does harm, a circumstance to be considered as the chief reason of opiates having by many been unjustly condemned in every case of inflammation.

With proper attention to the circumstances we have mentioned, the resolution of the tumor will, in general, begin to take place in the course of three or four days ; at least before the end of this period, it may for the most part be known how the disorder will terminate. If the heat, pain, and other attending symptoms, abate ; and especially if the tumor begins to decrease, without the appearance of Gangrene, we may then, with some certainty, conclude, that perseverance in the same mode of treatment, will at last accomplish a cure by resolution.

But, on the contrary, if all the symptoms rather increase ; and especially, if the tumor turns larger, and somewhat soft, with an increase of throbbing pain ; we may then with certainty conclude that  
suppuration



suppuration will take place : In such circumstances, those applications should be laid aside that were advised while a cure by resolution was judged to be practicable, at the same time that nature should be as much as possible assisted in the formation of pus, or what is called *maturation* of the tumor.

For this reason, blood-letting, and other evacuations which may have been advisable in attempting to remove the swelling by discussion, should never be carried a greater length than may be merely necessary for rendering the febrile symptoms moderate ; for where the system is much reduced, and suppuration afterwards takes place, the maturation of the tumor not only proceeds slowly, but the patient becomes unable to bear the discharge that must ensue from the opening or bursting of the abscess.

But although we have remarked above, that if some appearances of resolution do not take place in the course of a few days suppuration will most probably ensue,  
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and that consequently a change of treatment will become necessary, yet this, it must be observed, is to be taken in a limited sense. For the time of desisting from one mode of treatment and commencing the other, must always in some measure depend on the seat of the inflammation; such disorders being in some parts much more apt to terminate in speedy suppuration than in others.

Thus, in the cellular membrane, as well as in every soft part of the body, inflammatory tumors terminate much more readily and quickly than when tough membranous parts are affected. Hence, in the coats of the eye and of the testicles, very violent inflammation often continues for many days, nay, even for weeks, without either abating in the symptoms, or ending in suppuration. In such cases, therefore, that go on even to considerable length, we need not be afraid of continuing the discutient applications for a much longer time than otherwise would be proper; nor should we ever be deterred from using  
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them,



them, unless either an evident suppuration has taken place, or there appears from the violence of the symptoms a considerable risk, either of gangrene, or of some incurable obstruction: In which event, we should no doubt endeavour to promote the suppuration of the tumor.

Among other applications for the removal of inflammation by resolution, blisters ought not to be omitted, and I have in some instances known them prove useful, even where suppuration has taken place. In the early stages of inflammation, blisters should be applied directly upon the pained part; but when the skin is much inflamed, they excite so much pain that we rather apply them to the contiguous sound parts: in this manner they have appeared to promote the discussion of venereal buboes, even where matter has been evidently formed.

## SECTION III.

*Of Suppuration.*§ I. *General Remarks on Suppuration.*

**B**Y the term *Suppuration*, is understood, that process, by which the contents of tumors and ulcers are converted into a whitish, thick, opaque, somewhat fetid matter, termed *Pus*. This, for the most part, is the effect of nature alone; but we know from experience, that the formation of pus can be promoted by the efforts of art: Before proceeding, however, to consider the treatment necessary for this purpose, it will not be improper to premise an examination of the different opinions that have prevailed on the nature of pus, and this especially, as it will tend to elucidate

cidate many of the observations that will afterwards occur.

§ 2. *Of the Formation of Pus.*

By many pus has been supposed to consist in a dissolution of the blood-vessels, nerves, muscles, and other solids, of the parts in which inflammation occurs.

This was the opinion of Boerhaave \*, Platner †, and many others.

Others, again, have supposed purulent matter to be formed in the blood; and that it is secreted, in its complete state, into Abscesses, Wounds, and Ulcers.

That the first of these opinions is ill founded, is obvious from our observing, that very extensive wounds and ulcers continue often for a great length of time, without being attended with any loss of substance; which would not be the case, if the discharge which they afford was produced by a dissolution of the solids

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\* Aphorism, 387.

† V. Institutiones Chirurgiæ, § 54. &c.

of the parts in which they are seated. Issues, likewise, afford instances of this; by their yielding, for a number of years, even a daily discharge of pus, without producing any evident alteration in the state of the solids.

The other opinion has probably arisen from abscesses being sometimes observed to form suddenly, and without being preceded by any obvious inflammation; so that the matter contained in them has been supposed to be at once deposited from the blood, in a state completely purulent.

Previous, however, to the formation of pus in any part, if due attention was given, some degree of inflammation, it is probable, would be always observed. But as inflammation often occurs in a slight degree, and without being attended with much pain, it may sometimes proceed to the state of suppuration, without being sooner observed by the patient: and this we know, in internal abscesses especially, is not unfrequently the case. We are told, indeed, of very quick translations of  
matter

matter from one part of the body to another: but if such instances ever occur without the intervention of inflammation, a circumstance, however, much to be doubted; yet, still, it is no material objection to our argument, as such cases can only be considered as *particular*, and very *unusual*, exertions of the system.

It may be remarked also, that if purulent matter frequently existed in the blood, as it undoubtedly would do if this opinion was well founded; in some cases, at least, it would surely be liable to detection: but no matter of this kind has ever yet been discovered in blood. Such pus, too, as is found in wounds and ulcers, would not at first appear thin and serous, as it always does, if deposited in a completely formed state.

The most probable opinion hitherto advanced concerning the formation of pus, is, that it is a change produced by a certain degree of fermentation, upon the serous part of the blood, after being secreted into the cavities of ulcers and abscesses;



and that this fermentation is produced either by the natural heat of the part, or by heat artificially applied.

That it is the serum only of blood, which is proper for the formation of pus, and that it is produced by the application of a certain degree of heat, was first made probable by an experiment related by Sir John Pringle in the appendix to his treatise on the diseases of the army \*; and the opinion was afterwards confirmed by other experiments of the same nature made by Mr Gaber, and related by him at full length in the second volume of the *Acta Taurinensia*.

Sir John Pringle found, that pure serum, kept for some days in a furnace regulated to the human heat, after becoming turbid, dropped a white purulent sediment. The crassamentum of blood, in the same space of time and degree of heat, changed from a deep crimson to a dark livid colour; so that, when any part of it was mixed with water, it appeared of a  
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\* Experiment xlv.



tawney hue. Serum, digested with a few red globules, and in the same circumstances, was of the same colour.

Mr Gaber's experiments tend all to elucidate and corroborate the same opinion, namely, That pure unmixed pus is formed only from serum. The addition of red globules to serum, and crassamentum digested by itself, exhibited nearly the same appearances as those quoted above from Sir John Pringle \*. Fat, which is thought by many to be a principal ingredient in the composition of pus, was found by Mr Gaber, when exposed to the above mentioned trial, to exhibit no appearances of that matter; nor were any of the fleshy parts when digested either with serum or water, convertible into it.

From all which, it may be concluded, that the addition of any of these articles to serum, instead of rendering it capable of producing good pus, has always the very contrary effect; and that it is pure serum alone from which pus can be obtained.

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\* V. Act. Taurin. vol. ii. page 87.

It may here be remarked, once for all, that what is meant by *pure serum*, is not that finer halitus, which, in a healthy state of the body, is constantly secreting into the different cavities, merely for the purpose of lubricating and keeping them moist, and which is again generally absorbed; but it is a serous fluid of the same nature with that which separates spontaneously from blood, upon that fluid being allowed to remain at rest, when discharged either from an artery or a vein; and in which, though there is never supposed to be any mixture of red globules, yet there is certainly always more or less of the coagulable lymph; some proportion of which seems absolutely necessary for serum to possess, to render it capable of producing pus.

The several effects we have mentioned as being produced by digestion upon serum out of the body, there is reason to think will occur from it, when collected in the cavities of ulcers and abscesses; and, from the result of the different experiments alluded

luded to, it is probable, that, according as serum is there deposited more or less free from mixtures of fat, red globules, and other substances, it will yield pus of a more pure or vitiated nature.

This account of the formation of pus, is the most satisfactory, we conceive, of any that has as yet been given; and this especially, as it renders evident, as will afterwards appear, the operation of the remedies which usually prove most effectual in promoting suppuration.

§ 3. *Of the necessary Remedies for promoting Suppuration.*

WHEN, for the reasons we have enumerated, it is judged most proper to use means for promoting the suppuration of an inflamed part, then all the remedies we have recommended, in order to promote the resolution of the tumor, must be laid aside.

No farther evacuations, as was observed above, are to be admitted; and if the patient

tient has been much weakened, a full allowance of diet, and even a proportion of wine will be necessary.

For although a high degree of inflammation proves always unfavourable to suppuration, by promoting the progress of Gangrene, as will afterwards be mentioned, or as tending to propel into the cellular membrane, which in general is the seat of abscesses, a quantity of red globules, together with the serum of the blood, which alone ought to be extravasated for the formation of good pus ; yet, in order to have a due quantity of serum secreted for the purpose of suppuration ; and, at the same time, to have its fermentation properly carried on, the different inflammatory symptoms must never be allowed to subside suddenly ; otherwise an abscess, containing ill-digested matter, as it is termed, will most probably be produced.

Thus we find in small-pox, which are so many small phlegmasiæ, that although blood-letting and other evacuations to a certain extent prove frequently useful, that

a proper suppuration never takes place of the patient has been much debilitated by any considerable discharge; and the same thing very certainly occurs, in similar circumstances, in abscesses of a larger size. The patient, therefore, should neither be allowed to live so fully as might raise the inflammation too high, nor reduced in such a manner, by evacuations and low diet, as to induce the contrary extreme.

Having in this manner endeavoured to procure a discharge into the cellular membrane, of serum proper for the formation of pus, the next circumstance requiring attention, is, that a due fermentation be excited, and preserved in it, so that its progress towards perfect maturation, may go easily and regularly on.

This indication is chiefly effected by the use of such applications as tend to preserve a proper and constant degree of heat in the part affected: insomuch, that it seems probably owing to a want of attention to this circumstance, that the greatest part of all the softer swellings do  
not



not suppurate ; and that according to the degree of heat in which they are kept, whether from the proportion of inflammation by which they are at first produced, or from the natural heat of the parts they are seated in, they form into tumours of melicerous, steatomatous, and other consistences. For unless a due degree of heat be applied and continued, serum being merely extravasated will never produce pus : Hence in ascites, and other dropfical disorders, large quantities of serum remain in this state for a great length of time, without any suppuration taking place ; and this merely from such collections being produced without any inflammation at first, so that no assistance is afforded from any degree of *preternatural* heat ; and the *natural* heat of such parts, in which serous collections usually occur, is seldom so considerable as to produce such an effect.

The degree of heat best suited for promoting suppuration, is not perhaps easily to be determined ; but the more considerable



able it is, at least to a certain extent, the more quickly, it is probable, pus will be formed.

This we find, indeed, from Mr Gaber's experiments, is so far the case\*: and the observation is likewise confirmed by daily experience in every case of phlegmon; in which the tumor, *cæteris paribus*, always proceeds more quickly or slowly to suppuration, as it is seated nearer to, or at a greater distance from, the heart. Hence, in any of the extremities, particularly in the legs, inflammatory disorders proceed slowly to suppuration; while those on the trunk, and about the head, go on more quickly. Thus, inflammation of the ears and throat frequently arrives at a thorough maturation, and even bursts of itself in the course of forty-eight hours from the first attack.

We ought, therefore, to be particularly attentive to the preservation of a due degree

\* When speaking of pus being formed in, and subsiding from serum digested in a degree of heat equal to that of the human body, Mr Gaber says, "*Eo autem citius subsidebat quo calor erat major.*" *Loco citato.*

degree of heat in every inflamed part intended to be brought to suppuration; but more especially in situations very distant from the heart, where artificial heat is most wanted, and where, if duly applied, almost every tumor, though seated on the extremities, might probably be made to suppurate in the same space of time with those in the ears and other parts we have just taken notice of.

I am not only convinced, by experience, of what is here asserted of the advantages to be obtained from a due attention to this matter; but also, from a course of experiments I was engaged in some years ago upon the same subject. But as the result of these were almost exactly similar to those related by Mr Gaber, no exact account was preserved of them: this, however, I particularly remember, that in a heat equal to  $100^{\circ}$  of Farenheit's thermometer, the deposition of matter from serum took place in little more than half the time that was requisite for the same effect at even eighty degrees.

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It was the prosecution of these experiments that first suggested to me the probability of the advantages to be derived from the preservation of a due degree of heat in inflamed parts ; and I have accordingly, on many occasions since that period, found the treatment of such cases go on much more easily than otherwise I should either have expected or have been able to explain.

Warm fomentations and cataplasms are the means commonly employed for the application of heat to an inflamed part ; and when regularly and frequently renewed, nothing, it is probable, can more effectually answer the purpose. But, in the ordinary manner in which they are applied, being renewed only once, or at most twice, in the day, they must frequently do more harm than good. For as soon as the degree of heat which they at first possess, is dissipated, the moisture which they keep up, with the consequent evaporation that ensues, must always render the part much colder

colder than if it had been merely wrapped in flannel, without the use of any such application.

In order to receive all the advantages of such remedies, the part affected should be well fomented with flannels pressed out of any warm emollient decoction, applied as warm as the patient can easily bear them, continued at least half an hour at once, and renewed four or five times a-day.

Immediately after the fomentation is over, a large emollient poultice should likewise be applied warm, and renewed every second or third hour at farthest. Of all the forms recommended for emollient cataplasms, a common milk-and-bread poultice, with a proportion of butter or oil, is perhaps the most eligible; as it not only possesses all the advantages of the others, but can at all times be more easily obtained.

Roasted onions, garlic, and other acrid vegetables, are frequently made use of as additions to maturing cataplasms: When there is not a due degree of inflammation  
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in the tumor, and when it appears probable that the suppuration would be quickened by the inflammatory symptoms being somewhat increased, the addition of such substances may prove useful; but when stimulants are necessary in such cases, a small proportion of strained galbanum, or of any of the warm gums, dissolved in the yolk of an egg, and added to the poultices, is not only a more elegant, but a more certain form of applying them. In some cases, too, the same intention may be more certainly accomplished, by combining a small quantity of cantharides with any application we mean to employ.

Whenever the inflammation, however, takes place in a proper degree, such stimulating substances can never be necessary; and from the different observations we have already made, there is reason to think, that in many instances they might even do mischief.

In such tumors as, from their being attended with little or no inflammation, are commonly said to be of a cold nature, as



they are generally indolent, and proceed very slowly to suppuration, plasters composed of the warm gums are often employed with advantage: in such cases, they prove useful, not only by the stimulus and irritation which they excite, but by the heat which they tend to preserve in the part. They become particularly necessary, when the patient, by being obliged to go abroad, cannot have cataplasms frequently enough renewed, or so conveniently applied: but when some such objection does not occur, the latter, for very obvious reasons, should always be preferred.

Dry cupping, as it is termed, that is, cupping without the use of the scarificator, upon, or as near as possible to, the part affected, is frequently used with advantage for promoting the suppuration of tumors: it is only, however, in such as these last mentioned, where there seems to be a deficiency of inflammation, that it can ever either be necessary or useful; but in all tumors of an indolent nature, and where  
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there is still some probability of suppuration taking place, I have seldom observed such good effects from any other remedy.

These different applications, under the restrictions I have mentioned, being continued for a longer or shorter period, according to the size of the tumor, its situation and other circumstances, a thorough suppuration may, in general, at last be expected.

Matter being fully formed in a tumor, is known by the remission of all the symptoms which takes place; the dolor pulsatilis, that before was frequent, now goes off; and the patient complains of a more dull, constant, heavy pain: the tumor points at some particular part, generally near to its middle; where, if the matter is not encysted, or deep-seated, a whitish yellow appearance is observed, instead of a deep red that formerly took place; and the fluctuation of a fluid underneath, is, upon pressure, very evidently discovered. Sometimes, indeed, when an abscess is thickly covered with muscular and other parts;

and when, from concurring circumstances, there can be little doubt of there being even a very considerable collection of matter, yet the fluctuation cannot be readily distinguished: but it does not often happen, that matter is so very deeply lodged as not to be discovered upon proper examination.

This, however, is a circumstance of much importance in practice, and deserves, it may be remarked, more attention than it commonly meets with. In no part of the surgeon's employment, is experience in similar cases of more use to him than in this; and however simple it may appear, yet nothing, it is certain, more readily distinguishes a man of observation, than his being able easily to detect collections of deep-seated matter: whilst nothing, on the contrary, so materially affects the character of a surgeon, as his having, in such cases, given an inaccurate or unjust prognosis; for the event, in disorders of this nature, comes generally at last to be clearly demonstrated to all concerned.

Together

Together with the several local symptoms of the existence of pus which I have enumerated, the frequent shiverings that patients are liable to on its first formation, may likewise be mentioned: these, however, seldom occur, so as to be distinctly observed, unless the collection is considerable, or seated internally in some of the viscera. But, in every large abscess, they are almost constantly met with; and, when they appear along with other symptoms of suppuration, they tend always to ascertain the real nature of the disorder.

§ 4. *Of Abscesses, and of the proper Period for opening them.*

IN the treatment of abscesses, it is a general rule, not to discharge their contents till a thorough suppuration has taken place: for, when laid open long before this period, and while any considerable hardness remains, they commonly prove troublesome, and seldom heal kindly.

In some cases, however, it is necessary to deviate from this general rule, and to open them a good deal sooner; particularly in all such critical abscesses as occur in malignant fevers. In the plague, too, we are commonly advised to open such tumors as soon as they are tolerably advanced, and not to wait till they are fully matured; for, in such instances, it is found that the patient receives more benefit from an early discharge of matter, than he can suffer harm from having any swelling of this nature somewhat prematurely laid open.

Abscesses, too, situated on any of the joints, or upon either of the large cavities of the breast and abdomen, and more especially when they seem to run deep, should always be opened as soon as the least fluctuation of matter is discovered. For, when the resistance is on every side equal, they will just as readily point internally as outwardly; and the consequence of a large abscess bursting into either of the large cavities, is well known most frequently

quently to prove fatal: An instance of which, in the following case, I had some time ago an opportunity of observing, which, with very little attention, might have been prevented.

A surgeon of eminence, and of extensive practice, was applied to by a young healthy-looking man, with a large abscess upon the left side of his chest. A fluid, upon pressure, was evidently found to fluctuate; and an opening was determined upon, to give vent to the matter. But the operator being much engaged in business, could not fix on an earlier period for doing it than the third day from the first application of the patient; who unluckily died suddenly in his bed, the night before the abscess was to have been opened.

On examining the body, the tumor was found to have disappeared entirely, without any external opening being perceived; and, on laying open the thorax, the matter was observed to have burst inwardly upon the lungs, and hence had produced immediate suffocation.



In all other cases, however, the rule in opening abscesses should be, to allow a thorough suppuration to take place, before giving vent to the matter: We have next to determine on the mode in which it should be done.

§ 5. *Of the different Methods of opening Abscesses.*

Two methods of opening abscesses have been recommended by authors, namely, by Caustic and Incision. To the former, however, there are many objections. It is not attended with any superior advantage to a simple incision; upon a tender inflamed part, it gives much more pain; it is more slow in its effects; and the surgeon never has the command of it so entirely as to destroy those parts he would incline, and no more: for all the different kinds of caustic, notwithstanding the greatest attention, will sometimes spread farther, and penetrate deeper than was intended. Of this I, some years ago, saw a  
very



very remarkable instance ; and in a situation, too, in which it is not so likely to happen, as in other parts of the body.

Caustic was applied to the anterior part of the scrotum, with a view to produce a radical cure of a hydrocele : but whether there had been little water collected, or whether a preternatural adhesion of the testis to the tunica vaginalis had, at this part, been produced, is uncertain ; but the caustic penetrated to the body of the testicle, and gave the patient, as may readily be imagined, a great deal of distress. It did, to be sure, accomplish a cure : but the danger attending such an accident, although it probably might not frequently occur, is, I should imagine, a very strong objection to the use of caustic in all such cases ; and it is now indeed very generally, I believe, laid aside, the preference being justly given to the scalpel.

When tumors are not large, they are commonly opened by a longitudinal incision, with a lancet or scalpel. This should  
be

be so directed as to terminate at the most depending part of the swelling, and should be of such a size as may give a free discharge to the matter; about two thirds of the length of the tumor is for this purpose perfectly sufficient.

When abscesses, however, are of great extent, they are commonly laid open through their whole length; and when the teguments have been much stretched, we are advised by many to take part of them away altogether. But this is a practice which seldom, or perhaps never, should be followed; as there are scarcely any abscesses so large as to destroy entirely the contractile power of the integuments; and while this remains in any degree, there is still cause to hope that the parts may again recover their former tone and dimensions. It is surprising indeed to what extent this observation applies. In many instances, the skin has been known to recover its tone entirely, after having been for a time completely deprived of it.

These

These are the several modes of opening abscesses with the scalpel. Some inconveniences, however, are found to proceed from all of them: As soon as an incision is made into a tumor, the whole contained matter is discharged suddenly and at once: Whereby, when the collection is considerable, faintings and other disagreeable symptoms are often induced; and a free admission of air is given to a great extent of ulcerated surface.

The bad effects of air on all varieties of sores, is well known to every practitioner; but its pernicious influence, on a newly opened abscess, is often really astonishing. It first occasions a total change in the nature of the matter, and turns it from perhaps a very laudable pus to an ill-digested sanies; and afterwards brings on a quickness of pulse, debilitating sweats, and other such symptoms, which, for the most part, when the collection has been considerable, either carries the patient off in a short time, or terminates in a confirmed phthisis, which sooner or later proves fatal.

This

This I have, in many instances, had occasion to observe ; and that, in such cases, it is the admission of air alone which produces these bad symptoms, is rendered highly probable from a great proportion of patients who have laboured under such disorders, having remained for a very considerable time, with large abscesses fully formed, and without having any hectic symptom whatever : But whenever they have exceeded an ordinary or moderate size, I have seldom known an instance of their being opened by a large incision, without almost every hectic symptom taking place ; and this generally in less than forty-eight hours from the time of the abscess being laid open.

In what manner the admission of air to an abscess operates in producing such a powerful and sudden effect, is perhaps difficult to determine. The irritation produced by it, on a large extent of ulcerated surface, may probably be one reason :—By acting as a stimulus on the extremities of the different absorbents opening into the  
fore,

fore, it may occasion a larger absorption of matter than would otherwise take place ;— and it may likewise, by rendering the matter more putrid than before, give even to the same quantity absorbed greater activity in producing the different symptoms of fever.

That this conjecture is well founded, with respect to an increase of putrescency being the principal cause of the bad effects produced by the admission of air to fores, is, from different circumstances, at least exceedingly probable. For, in the first place, although the discharge from abscesses is commonly mild, and free from any disagreeable fetor on their being newly laid open ; it almost constantly becomes thin, acrid, and more fetid in the course of a few dressings, which is a certain proof of a greater degree of putrescency having then taken place. On this principle, too, we may account for the operation of many of the remedies commonly employed in the treatment of fores ; and more especially of those powerful antiseptics, fixed air and Peruvian bark.

We



We know from experiment likewise, that other substances, as well as that part of the blood from which pus is formed, is rendered putrid, and more quickly so, by the admission of air, than otherwise, while in the same degree of heat, they probably ever would be \*.

From these considerations, therefore, the greatest caution appears to be necessary for preventing, as much as possible, the admission of air to the internal surface of every collection of matter; and this, we may remark, is very easily and effectually done, by opening collections of this kind by means of a seton or cord, instead of having recourse either to caustic or the scalpel.

This method of discharging the contents of tumors, by the introduction of a cord, is attended with every advantage of that by incision: it, moreover, empties the swellings, of whatever size they may be,

\* *Vide* Sir John Pringle's and Mr Gaber's experiments on this subject. *Loc. cit.*



be, not suddenly, but very gradually ; it effectually prevents a free admission of air ; it is not commonly attended with so much pain and inflammation ; nor is the cicatrix occasioned by it ever inconvenient, or unseemly, as it often is after a large incision.

At one time it was the practice in the Royal Infirmary of this place, to open large abscesses, as well as those of a smaller size, by extensive incisions : the consequences were such as I have related ; many of the patients were thrown into such obstinate hectic fevers as they never recovered from ; and others, though they did get better at the time, were commonly so much reduced, that they were apt to be seized with other disorders, from which they seldom recovered.

This was the most frequent result of our treatment of large abscesses by incisions ; and similar consequences will still be found to prevail where this practice is continued : but since the seton came to be generally used, few or no such disagreeable circumstances

circumstances have occurred. Many of the largest tumors have been opened in this manner; and when the patients are otherwise healthy, they very commonly do well; with this farther advantage, that a cure is frequently obtained in less than half the time usually found necessary on a tumor being opened with a large incision.

The opening of abscesses by the introduction of a seton, has been mentioned by different authors, and in small collections of matter has been frequently practised; but never so generally, I believe, as it has been here within these last thirty years, both in the hospital and in private. And in justice to Mr James Rae, late surgeon in this place, it must be acknowledged, that we are chiefly indebted for it to his recommendation, he having first proposed the general use of setons in such cases, at the same time that he invented a set of instruments, by which they are easily inserted in almost all abscesses, however deep-seated, and among whatever parts they may

I run;

run; and this too, without any risk of wounding the large blood-vessels, nerves, or contiguous tendons.

Several sets of these instruments, for abscesses of different sizes, are kept in the Infirmary here: they fulfil the intention, as I have observed, exceedingly well, and are a very ingenious contrivance. But as the curved director delineated in plate III. answers the purpose equally well, and is in itself fully more simple, it will for this reason be found more convenient. It is used in the following manner.

An opening sufficiently large for the cord, being made with a lancet in the superior part of the abscess, the director, threaded with a cord of candle-wick cotton, or soft silk, proportioned in thickness to the size of the tumor, is then to be introduced, and its point pushed downwards till it is felt externally, exactly opposite to the most depending part of the swelling. The director being kept firm by an assistant, an incision is to be made with a scalpel upon its under extremity,

of a length somewhat more considerable than the opening first made by the lancet: for when this is neglected, and when of course the under orifice is not larger than the upper, the matter is very apt to transude above; which always proves inconvenient to the patient, but which in this manner may be easily avoided. The director is now to be drawn downwards, with so much of the cord as to leave two or three inches hanging out at the lower orifice. In order to cause the cotton run easily on its first introduction, as likewise at the subsequent dressings, as much of it as is to be used at the time should be well rubbed over with any emollient ointment.

In twenty-four hours or thereby from the insertion of the cord, it ought to be drawn downwards, so as to admit of all that part of it being cut off which had been lodged in the abscess; and in this manner the same quantity should be moved daily, as long as from circumstances it may appear to be necessary.

A regular and slow discharge of the matter is thus produced ; the sides of the abscess are thereby allowed to contract gradually ; and a slight inflammation being produced over the whole internal surface of the diseased parts, they are thus made to unite much sooner than they otherwise would do. As the discharge becomes less, so the size of the seton should also be gradually lessened ; and it is easily done, by withdrawing a thread of the cotton once in two or three days. At last, when there is little more matter afforded than might be looked for from the size of the cord, it may be altogether taken out ; and gentle pressure being continued upon the parts affected by a roller for a few days longer, a pretty certain and lasting cure may generally be expected.

In the introduction of the seton it was expressly said, that it should be made from above downwards ; that is, by an opening made in the superior part of the abscess. The reason for such a restriction



is this, that when the first opening is made in the depending part of the swelling, a considerable quantity of matter immediately runs out, which, as it causes the sides of the upper part of it to collapse, renders it more difficult to introduce the director through the whole course of the abscess, than when done in the manner directed: when properly executed, the bottom as well as every other part of the tumor is kept distended to the last, very little of the matter escaping by the upper orifice. Being introduced in this way, too, the quantity of cord that still remains to be used is kept clean and dry; which it cannot possibly be when inserted from beneath.

To some these circumstances may appear too trifling to deserve such particular notice; but too much can never be said in rendering the account of a beneficial practice clear and evident.

All that has hitherto been said of the use of setons in cases of abscess from recent inflammation, applies with equal propriety



priety to tumors of long duration, when the matter contained in them is either of a purulent nature, or of a consistence not much thicker than pus. All encysted tumors of the thinner melicerous kind, are as successfully treated in this manner, as recent abscesses: so that the practice is by no means confined to one kind of tumor only; and it may even probably be employed in others, for which it has not as yet been advised.

It answers particularly well in all collections of matter in glandular parts, where the admission of air is attended with even worse consequences than in other parts. Thus, when it is judged advisable to open scrophulous swellings, they commonly heal much sooner and more easily with the seton than by a large incision. Venereal buboes, too, when fully matured, and when the teguments are not become too thin by being long overstretched, heal more readily by this management, than with any other.

From the practice answering so well in every case of abscess, it was at last, a good

many years ago, employed by the late Mr Rae, in the Infirmary here, in the hydrocele, or collection of water in the *tunica vaginalis testis*; and, a considerable time thereafter, the practice was adopted by the late Mr Pot. I must acknowledge, however, that from the several instances I have yet seen of its effects in this disorder, I am inclined to think, that it ought not to be preferred to the simple incision. For, though I never knew an instance, when the operation was properly done, of its failing to produce a radical cure, yet the friction of the cord upon the body of the testis, to which, in this operation, it is immediately applied, generally occasions a very high degree of inflammation; considerably more than is commonly produced by the simple incision.

This was my opinion in the year 1778, when the first edition of this book was published. Since that period, I have had no other reason to alter it, than to be more and more convinced that the treatment of hydrocele by seton, is productive of more  
pain

pain than any other method of cure now in use ; while, at the same time, it is not more certain in its effects than the simple incision. And, accordingly, although I could not at that time speak with precision of the merits of this operation, I am now satisfied that the cure by incision ought, in every instance, to be preferred.

But when, in such cases, it is resolved to employ the seton, the method of introducing it, as we have directed for abscesses, with a curved director of a proper size, seems more simple, though in other respects perhaps not better, than the mode recommended by Mr Pott, which being with the help of a common trocar, appears to be neither safe nor easily performed. For instances have occurred, even with very able surgeons now living, where the body of the testis has been wounded by puncturing with that instrument.

## SECTION IV.

## OF MORTIFICATION.

§ I. *General Remarks on Gangrene.*

THE termination of inflammation, by Resolution and Suppuration, having been fully considered, we come next in order to speak of Gangrene or Mortification.

The several appearances of Gangrene having been already enumerated, it is not now necessary to mention them: Only, it may be remarked, that a thorough mortification, or the last stage of gangrene, is known only by the diseased part becoming totally black, by its losing all pain and sensation, at the same time that it usually emits a considerable fetor: at last, too, a softness

softness or flaccidity takes place, together with an entire dissolution of the different parts of which the organ is composed.

This does not indeed happen in every instance of Gangrene; for there are some instances of what is called Dry Gangrene, in which the parts continue totally mortified for a great length of time, without either turning flaccid, or running into dissolution.

Such cases, however, do not occur from inflammation. They commonly happen from the flow of blood to such parts being stopped by compression *viz.* by tumors, ligatures, or other similar causes, obstructing the principal arteries that used to supply them; which, when the stoppage of the circulation is complete, always occasions a very slow mortification; and as the parts, in such instances, are no longer supplied with fresh quantities of fluids, while a considerable exhalation must still be going on, such a degree of humidity cannot therefore occur, as in other cases of gangrene.

Hence



Hence this species of the disorder has, perhaps with propriety enough, been termed the Dry Gangrene.

Another variety of the disease is mentioned by authors, *viz.* the White Gangrene\*; in which the parts supposed to be mortified do not turn black, but retain nearly their former colour. Whether this complaint, however, can with propriety be denominated Gangrene, may probably be doubted: but as it is chiefly that species of the disorder which succeeds to inflammation, that we can now with propriety consider, and in which no such varieties are ever observed, we shall not at present carry our inquiry farther; and it is the less necessary, as nearly the whole course of the treatment, to be afterwards pointed out, applies, with almost equal propriety, to every variety of the disease.

Of all the inflammatory complaints to which the system is liable, that variety of the disorder termed Erysipelas, is observed most frequently to terminate in gangrene; and

\* Quesnay, *Traité de la Gangrene*, p. 337.

and whenever phlegmon is in any degree conjoined with erysipelas, as sometimes happens, it seems thereby to acquire a similar tendency, not only in being more difficult to bring to suppuration than the true phlegmon, but by going on more frequently to the state of mortification.

THE best and surest means of preventing mortification, is to endeavour to obtain either the resolution or suppuration of the tumor, by a due application of the remedies we have already pointed out. But, in some cases, the disorder is far advanced, and gangrene already begun, before the surgeon's assistance is called in; and, in others, the inflammation runs so high, and proceeds so quickly, that gangrene takes place notwithstanding all the remedies we can employ: In some instances, this happens so quickly, that the inflammation is scarcely discerned till mortification appears to commence.

§ 2. *Observations on Carbuncles as a Species of Gangrene.*

THIS rapid progress of inflammation occurs most frequently in cases of Carbuncle, what by the French is termed Charbon; in which the inflammation proceeds so quickly to mortification, that in some cases no evident tumor takes place, and the parts become black, and completely mortified, often in the course of twenty-four hours from the first attack.

The quick progress usually made by Carbuncle, renders it the worst and perhaps the most dangerous species of inflammation. Patients indeed often recover from external carbuncles, when not very extensive, and not seated on any of the large blood-vessels and nerves; but when they fix upon any of the viscera, they must, probably in every instance, prove fatal, as no remedies with which we are acquainted can prevent their progress towards the last stage of mortification.

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As carbuncles commonly appear without any evident cause, they are in general most probably owing to a scorbutic or putrid state of the fluids; for, when putrescency prevails in the system, every inflammatory tumor that occurs, proceeds much more readily to the mortified state than inflammation in other circumstances ever does.

This opinion of carbuncles depending upon a putrescent state of the system, seems to be confirmed by their occurring most frequently as a symptom in pestilential diseases; for, although they are sometimes met with even in this country, where the plague is now never known, yet the real carbuncle is by no means a common occurrence.

In such instances we easily account for gangrene, from the predisposition in the system to putrid disorders: But in what manner is it produced by inflammation in other cases, and where no such disposition can be supposed to take place? This we shall proceed to investigate.

§ 3. *Of the Causes of Gangrene.*

AN increased action in the vessels of affected parts, we have already endeavoured to establish as the immediate or proximate cause of inflammation ; and the same cause will, in many instances, account for the rise of mortification.

One evident effect of an increased action in the vessels, in every case of inflammation, is a propulsion, into the smaller capillaries, of a greater quantity of the more dense parts of the blood than naturally they were meant to transmit. When this is not considerable, a due circulation is frequently in a short time restored, and no bad consequences ensue, nay, even when an actual extravasation of the serous part of the blood into the cellular membrane has in some degree taken place, the fluid is often reabsorbed, and a cure is thus obtained by resolution. But when such extravasation produced by a farther increase of this undue action of the vessels, has taken place to a still greater degree, suppuration is then the most frequent consequence.

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When, again, a strong exciting cause is applied to a constitution already pre-disposed to inflammation; as a lacerated wound, for instance, in a young healthy man; the violent irritation, and consequent increased action of the vessels that ensues, occasions the red particles of the blood to be likewise poured forth together with the serum. In this manner a collection of an extravasated fluid is produced, and the great degree of preternatural heat kept up by the disorder, very readily excites in it some degree of fermentation; which, from the nature of the fluid it has to act upon, not being able to produce purulent matter\*, and the crassamentum of blood being particularly liable to run into the putrid fermentation†, mortification,

\* Mr Gaber, when speaking of his experiments upon the crassamentum of blood, says, that he could never obtain genuine pus from it; and farther adds, “*Vero similis ergo sanguinem cæteris puris principiis admixtum, ipsum magis fatidum et deterius reddere,*” &c. *Loco citato*, p. 87.

† For some animal substances, such as urine, the bile, and the crassamentum of blood, *soon* putrefy. Sir John Pringle’s Experiments, Appendix, p. vi.

mortification, which we may here consider as the ultimate stage of putrefaction; comes in course to be produced.

Mortification being, in this manner, excited, the progress which it afterwards makes, does not appear difficult to explain. The putrescent particles of the tumor, by insinuating into the cellular membrane of the contiguous parts, as in this manner they extend the contagion, so they soon bring these likewise to suffer. In this way, the mortification continues to advance; till meeting with a part, perhaps, naturally more irritable than the others, or which by this time has been rendered so by the different remedies to be pointed out, a certain degree of new inflammation comes to be easily induced, in consequence of the stimulus which putrid particles must always occasion: This, as it renders the parts more firm and compact, makes them less easily penetrable by the putrescent contagion; and a suppuration of course ensuing as a consequence of the preceding inflammation, a complete  
I separation

separation of the diseased from the sound parts, is thereby, in general, soon accomplished.

At least, that such an inflammation, with a consequent suppuration, does, in cases of gangrene, always happen before the diseased parts separate from the sound, is a fact well known to every practitioner; and, that the cause assigned above for these appearances is the true one, is rendered highly probable, by the different circumstances I have mentioned.

Thus the local symptoms of gangrene appear to be pretty clearly explained; and the sinking of the pulse, which, in extensive mortification, always occurs, and which is by much the most remarkable change that takes place in the system, is a very natural consequence of that debility, which seems to be a constant and necessary attendant on a putrescent state of the fluids, from whatever cause it may have arisen; a circumstance we have particularly demonstrated in putrid fever, and in scurvy, where a languid pulse and ge-

neral debility are always considered as the most characteristic symptoms.

§ 4. *Of the Prognosis in Gangrene.*

IN every case of gangrene, the prognosis should at first be doubtful; for even in the slightest affections of this nature, the system, from the contagion it receives by the absorption of putrid matter, is, in some instances, so much injured, that the patients are suddenly carried off, without appearing previously to have been in any imminent danger.

In such cases, however, as succeed to inflammation from an external cause, where the gangrene is neither very deep nor extensive, and where it does not seem to spread, the prognostic ought to be much more favourable than in those arising suddenly from an internal cause, where the mortification runs deep, and more especially when it is still continuing to advance; in which circumstance the greatest danger is always to be apprehended.

Indeed, no person whatever, with any considerable mortification, even from an external cause, can be said to be free from risk, till the diseased parts are separated, and entirely cast off from the sound; the poison of putrid miasmata being of such a penetrating and destructive nature, that many instances have occurred of patients being quickly carried off, seemingly from this circumstance alone, long after the progress of the mortification had ceased. In such cases we presume, that the putrescent miasmata prove destructive, chiefly by their deleterious influence on the nervous system. In long continued cases of mortification, the general mass of fluids may sometimes suffer from the absorption of putrid effluvia; but as patients, labouring under mortification, frequently die suddenly, and before any putrescency has appeared in the system at large, we conclude that this most probably happens from some effect produced either upon the nerves themselves, or on the sensorium, from whence they originate. But in whatever



manner the putrid fomes of a mortified spot may operate, their influence is frequently so pernicious as to warrant the conclusion I wish to establish, namely, that no person labouring under mortification, can be said to be free from danger till all the diseased parts are removed.

§ 5. *Of the necessary Remedies in Gangrene.*

IN the cure of Gangrene, when no blood-letting or other evacuation has been prescribed during the preceding state of inflammation, if the pulse continues quick, full, or hard; and especially if the patient is young and plethoric; it then becomes necessary, even although mortification may have commenced, to empty the vessels by one general blood-letting; which, by moderating the fever, proves often the surest means of preventing the progress of the disorder: And, in this view, blood-letting, in such cases, may, in reality, be considered as an antiseptic; and it often, indeed, in this particular state  
of

of mortification, proves more useful than any other remedy we employ.

In the same view that we recommend blood-letting, gentle laxatives, and a free use of acidulated cooling drink, become necessary. But as, in the farther progress and continuance of mortification, the patient is very apt to sink, and the pulse to turn languid, every evacuation, especially of blood, should be directed with caution, and never carried farther than may seem necessary for rendering such symptoms moderate as at the time appear to be too violent.

When, again, as is most frequently the case when gangrene has made much progress, the patient is much reduced, either by severe evacuations, or merely by the effects of the disorder; when the pulse is low, and the other symptoms of fever not considerable; in these circumstances a very contrary treatment becomes necessary: the principal indication now being, to prevent the system from sinking too much, by a proper use of cordials, and e-

specially by those of the tonic kind; while, by the same means, we enable it to free itself from, or to cast off, the mortified parts. For, as we have already observed, the separation of gangrenous from healthy sound parts, being always the effect of inflammation, it should be our chief care to assist nature as much as possible, in exciting in the system, by every proper means, that disposition which, from experience, we know to be most favourable for the production of inflammation; which, when speaking of the general predisposing causes of inflammatory complaints, we have endeavoured to show, is a full plethoric state of the vessels, and which at the same time is generally conjoined with a more invigorated tone of the vessels themselves.

It may, perhaps, be imagined, that this indication proves, in some measure, contradictory to what we have just had occasion to mention of the propriety of blood-letting in some cases of gangrene; but when duly considered, it will not appear to be so. For we well know, that, in every

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ry disease to which the system is liable, an over-dose of the most effectual remedy will often prove just as detrimental as a medicine of the most opposite tendency : and, in the same manner, though a certain degree of inflammation is, perhaps, necessary for the cure of gangrene ; yet, in a very high degree, it becomes always hurtful.

With a view to fulfil the intention of this indication, a good nourishing diet becomes necessary, with such a proportion of generous wine as the strength of the patient, and symptoms of the disease, may seem to require.

By a due attention to regimen, particularly by a proper allowance of wine, much more real advantage is commonly obtained, than we ever experience from the whole tribe of stimulating warm cordials. When, however, the patient is languid and much reduced, some of these, such as the volatile alkali, and confectio cardiaca, may, at the same time, and in such quantities, be prescribed, as the im-

mediate situation of the patient may seem to render necessary.

But of all the medicines hitherto used in mortification, none proves so certainly efficacious as the Cortex Peruvianus, which has often a very evident and powerful influence in putting a stop to the disorder. As it is a very powerful tonic, it may probably act by invigorating the general system; and thus, by rendering it more susceptible of that inflammatory tendency, which we have shown to be so necessary for effecting a separation of mortified parts, it may in this manner enable it to throw them off. It may likewise, perhaps, in some instances, act as an antiseptic, merely by correcting putrefaction; but in order to have such influence in this manner, it ought, I imagine, to be locally applied to the diseased parts.

But in whatever manner the bark may operate, it can in no case of mortification be, with propriety, omitted, excepting in the first stage of the disease, while several of the inflammatory symptoms yet remain



remain violent: As soon as these are abated, it may always, both with safety and advantage, be employed.

The best rule for the quantity of bark to be exhibited in gangrene, is that the doses should be large, and as frequently repeated as the state of the stomach will permit. It proves often, indeed, a great inconvenience in gangrene, that the stomach cannot contain a sufficient quantity of the bark in substance, which is always the best mode of using it; but particularly in gangrene, where none of the finer preparations of bark are ever to be trusted.

Of all the forms employed for exhibiting bark in substance, I have generally found it sit easiest on the stomach when conjoined with one or other of the spirituous waters; and to the use of which, in such cases of gangrene as require bark to be given, there can never be any objection. The following formula is far from being disagreeable, and I have known it  
answer

answer with patients whose stomachs rejected every other.

Rx. Aq. alexiter. simp.

cinnamon. fort. aa unc. iii.

tinctur. aromat. unc. ii.

Pulv. cort. Peruv. subtil. unc. fs. misce;  
coch. ii. omni semihora sumendis,  
agitata phiala.

In this manner a drachm of the bark is taken every hour, which frequently in less than twenty-four hours, has some influence on the appearance of the disease. Much depends upon the medicine being in fine powder, as patients often bear considerable quantities in that state, when they reject even very small doses of a coarse powder.

As a species of bark has, of late years, been employed, of a more deep red colour than the kind in ordinary use, I think it right to mention the result of my own experience of it. I cannot pretend to form any judgment of the effects of this remedy in the cure of intermittents, as, in Edinburgh and its environs, agues are  
feldom

seldom met with. But, so far as I have yet seen, its influence, in cases of gangrene, and in correcting the thin fetid discharge of putrid ulcers, is inferior to that of the best ordinary bark of a brown or cinnamon colour. One very remarkable instance of this it may not be improper to mention: A gentleman, for several years, had laboured under a sinuous ulcer, the discharge of which, once in two or three months, always became thin, putrid, and very acrid. The influence of common bark, in correcting this, was so remarkable, that a few doses commonly had a considerable effect in rendering the matter thick, and less offensive. From the taste, and other sensible qualities of the red bark, being stronger than those of the ordinary kind, I was at first inclined to think favourably of it; and among others I prescribed it to this patient. But although he continued for several days to take it in the same doses he had always used of the other, he did not experience any advantage from it; while, on the other

ther hand, on the common bark being again employed, the matter, from being thin and fetid, was quickly converted into pus of a proper consistence.

One trial, however, is by no means sufficient for enabling us to form a just opinion of any medicine: And accordingly I was resolved to put it to the same test in future occurrences of a similar nature. It has now been three times tried in the same manner, and the result has been always the same. The red bark has never produced any change on the nature of the discharge, while the influence of the other has been uniformly the same. Indeed, our patient is now so much convinced of the inefficacy of the former, that it is with reluctance he is induced to take it; although, at first, his expectations from it were raised very high, not only from the opinion I had endeavoured to give of it, but from the high panegyrics bestowed on it by others.

This is the most remarkable case I have met with for comparing the effects  
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of the different kinds of bark: but I have likewise seen the red bark fail in other cases, where the common kind of it proved evidently useful; so that, although I cannot with certainty say that the red bark will never prove useful in cases of mortification, and in such ulcers as we have described, yet from the result of all the experience I have yet had of it, I am inclined to consider it as of an inferior nature to the other. Farther observation, however, is necessary to determine a matter of such importance.

Together with bark, the vitriolic acid is frequently employed with advantage; and the best form of using it is, by acidulating the patient's drink with elixir of vitriol.

These are almost the only internal remedies to be depended on in case of gangrene. Many others, indeed, have been recommended; but all the advantages to be obtained from any of them, may be procured with more certainty from some or all of those I have enumerated.



A variety of external applications are pointed out by authors, particularly those of the antiseptic kind; such as, all the warm gums and balsams, ardent spirits, and even alcohol: and to admit of their nearer application to the sound parts with a view to the preservation of these from putrefaction, deep scarifications through the diseased and into the sound parts have been generally recommended.

But although such articles may be of use in preserving *dead* animal-substances from corruption; yet that they will prove equally serviceable when applied to living bodies, is probably much to be doubted: There is even cause to imagine, by the strong irritation which they excite when applied to a living fibre, that, in such cases as the present, they may rather do harm; it being only, as I have observed already, a very slight degree of inflammation that is required. The incisions, too, when carried into the sound parts, with a view to facilitate the operation of such remedies, may likewise do harm;

harm ; not only from the risk of wounding the blood-vessels, nerves, and tendons, that lie in the way ; but also, by allowing a free and farther entrance of the putrescent matter into the parts not yet affected : And unless they are carried so deep as freely to reach the sound parts, applications of the antiseptic kind can never have any effect in answering the purpose for which they are intended. For these reasons, and from never having observed any advantages to accrue from scarifications, I have long thought that they ought to be laid aside \*.

### Theriac

\* Although I was convinced, from experience, of what I have advanced against the use of scarifications, as well as of the impropriety and inefficacy of very warm stimulating applications in mortification ; it was not without diffidence that I first ventured to assert it, the opinion at that time being in a great measure new. I am now happy to find, however, in a late publication, the same practice recommended from the best authority. *Vide* Chirurgical Observations by Percival Pot, F. R. S. &c.

In the same publication is given a particular description of a species of mortification incident to the toes and feet, in which Peruvian bark has little or no influence, and in which opium, given in large doses, frequently repeated, proves a very effectual remedy.

Theriac was, in former times, and still is, with some practitioners, a very common application in gangrene; but from any opportunities I have had of seeing it used, I cannot say that it ever seemed to produce any obvious advantage.

All the advantages we derive from the great variety of applications usually pointed out for gangrene, are obtained with more ease, and generally with more certainty, from the use of any stimulating embrocation; which, by exciting a slight irritation upon the surface, and especially when assisted by a free use of bark, at last commonly excites the wished for degree of inflammation. With this view, I have frequently employed a weak solution of sal ammoniac in vinegar and water, and often with advantage: a drachm of the salt to two ounces of vinegar, and six of water, form a mixture of a proper strength for every purpose of this kind; but the degree of stimulus can be easily either increased or diminished, by using a larger or smaller proportion of the salt.

Although

Although, for the reasons I have already advanced, incisions may not, in general, be proper: yet, whenever the mortification runs deep, scarifications should be made into the diseased parts, with a view to remove a portion of them, which, by taking off a considerable load of putrid dead matter, not only lessens the fetor, which, in such cases, is always considerable, but often renders it more easy for the sound parts to throw off the remainder: When incisions, however, are employed for this purpose, care should be taken that they be not carried so deep as to injure the sound parts.

When, by the means we have recommended, or by the effects of a natural exertion of the system, a slight inflammation begins to arise between the diseased and sound parts, we may, in general, with some certainty, expect that, in due time, an entire separation will take place: and, when a full suppuration has fairly commenced, there will be still less cause to doubt of a cure being to be obtained.

On the mortified parts being removed, the remaining fore being in the state of a simple purulent ulcer, must be treated as sores of this description usually are, with mild easy dressings; at the same time, that the strength of the patient should be supported by the continuance of nourishing diet, the bark, and such quantities of wine as may be necessary.

In this manner, all ulcers produced by gangrene, may be healed, where the disease has not been very extensive; but where mortification, seated on any of the extremities, has penetrated deep, so as to reach the bones, and where the surrounding soft parts are destroyed, amputation of the member becomes our only resource: This measure, however, should never be advised, till a full and complete separation of the mortified parts has taken place; and it ought, in every case of gangrene, to be held as an established maxim, never to amputate a member till a full stop has been put to the disease, or till the mortified parts have been completely separated

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ted from the sound: For, although the parts immediately contiguous to those *evidently* diseased, may outwardly appear to be sound, yet there can never be any certainty of those, even directly beneath, remaining so till a separation occurs; so that, till a separation has taken place, the disease will still be apt to return upon the remaining stump.

It must be observed, however, that as soon as an entire separation of the gangrene is perceived, no time should be lost in putting the operation in practice; for, as long as any of the corrupted parts remain in contact with the sound, the system must still be suffering considerably, by the constant absorption of putrescent particles, that so long will still be going on.

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## CHAPTER II.

### Of TUMORS.

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#### SECTION I.

##### *Of Tumors in General.*

**E**VERY præternatural enlargement, in whatever part of the body it is seated, may be termed a Tumor.

Tumors daily occur in one form or another: They are often followed with important consequences, and frequently give much embarrassment both to patients and surgeons: For these reasons they merit particular attention.

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We meet with much variety in the general appearances of tumors, as well as in the method of treatment best suited for their removal: But such varieties only should be mentioned in a work of this kind, as require some peculiarity in the method of cure.

Tumors may with propriety be divided into two general classes: Into those that are of an acute or inflammatory nature; and such as are chronic or indolent. Authors have for the most part distinguished them into such as are said to be of a warm nature, and those which they suppose to be cold, from their being destitute of pain and redness, symptoms which we commonly observe to accompany heat. But the terms we have mentioned of Acute or Inflammatory, and Chronic or Indolent, are more scientific; at the same time that they are more expressive of the real nature of the different affections: For it will be found to hold perhaps universally, that tumors are acute or indolent, that is, that they are rapid or slow in their progress,

nearly in proportion to the degree of inflammation with which they are attended. I mean therefore to rank in the first class of tumors, all such as from their commencement are accompanied with inflammation; and in the second, all those which are not evidently accompanied with this symptom.

It will unavoidably happen, however, that some tumors will be mentioned under one class, which, during some part of their progress, may appear to belong to the other: Thus, a tumor beginning from inflammation, may terminate in a state of perfect indolence; while others, which at first were evidently chronic or indolent, may at last become highly inflammatory. We shall endeavour, however, to characterize them by those symptoms which appear most obviously at their commencement; a mode of distinction which appears to be the most accurate; for it is not what a tumor may eventually become, but what it actually is on its first appearance, that can admit of any description:

And

And although all the variety of tumors which fall within our observation, or of which I mean to treat, are enumerated in the following classification, many of them will fall with more propriety to be considered in other parts of the work. Thus, the consideration of aneurism and thrombus succeeds to blood-letting, as being most frequently induced by that operation. Collections of matter in the Antrum Maxillare, gum, boils, and other affections of the mouth, fall to be noticed immediately after toothach; while we have already finished the consideration of abscess and mortification, as the consequences of phlegmon.

### CLASS I.

#### *Acute or Inflammatory Tumors.*

Phlegmon, with its consequences, abscess and mortification.

Erysipelas.

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Ophthalmia.



Ophthalmia.

Inflammation of the ear.

Angina, or inflammation of the throat.

Inflammation and abscess of the liver.

of the breasts of women.

of the testes.

of the anus and perinæum.

Venereal buboes.

Lumbar abscesses.

Paronychia or whitloe.

Chilblains.

Sprains and contusions.

## CLASS II.

### *Chronic or indolent Tumors,*

Encysted tumors, usually so termed.

Ganglions.

Swellings of the bursæ mucosæ.

Concretions and preternatural excrescences within the capsular ligaments of joints.

Aneurisms.

Aneurisms.

The true, the false, and varicose  
aneurisms.

Varicose veins.

Hemorrhoidal swellings.

Hydropic swellings.

anasarca or œdema.

hydrocephalus.

hydrops pectoris, and  
hydrops pericardii.

ascites.

dropsy of the ovaria.

hydrocele.

spina bifida.

Swellings in the sublingual glands.

Tumors containing air.

General emphysema produced by air escaping from the lungs into the cellular substance, as sometimes happens from the spiculæ of fractured ribs penetrating the substance of the lungs.

Local emphysematous tumors produced by putrefaction in a particular part.

This is a rare occurrence ; but cases of it are recorded by different authors.

Tympanitis.

Tympanitis.

Tumors formed by the displacement of particular parts.

Herniæ :

of the brain.

inguinal and scrotal.

congenital.

crural.

umbilical.

ventral.

at the foramen ovale.

in the perinæum.

of the alimentary canal and mesentery.

of the omentum.

of the liver, spleen, and other abdominal viscera.

of the bladder.

of the intestines into the vagina.

Protrusion of the eye-ball.

Prolapsus uteri.

Prolapsus ani.

Tumors formed by the displacement of bones in cases of dislocation.

Scrophulous tumors.

White

White swellings of the joints.

Hydrochocele.

Scarcomatous tumors.

Sarcocele.

Schirrus.

Cancer.

Polypous excrescences in the nose and  
throat.

Polypi in the ear.

in the uterus.

Condylomatous tumors in the anus.

Excrescences in the urethra.

Nævi materni.

Warts.

Corns.

Tumors from affections of the bones.

Simple exostoses.

Venereal nodes.

Spina ventosa.

## SECTION II.

*Of Acute or Inflammatory Tumors.*

THE general theory and management of inflammation have been fully considered in the preceding chapter. We must therefore refer for this part of our subject to what was then said upon it: And in considering those varieties of tumors in which inflammation takes place, such circumstances only will be noticed as from peculiarity of situation, or some other cause, require a particular mode of treatment.

§ I. *Of Erysipelas.*

ERYSIPELAS as being a variety of inflammation, has in some instances been mistaken for phlegmon: The two affections; however;



however, may for the most part be easily distinguished : In phlegmon, the inflammation is circumscribed and elevated. In general, it is seated in the cellular substance ; and any effusion which takes place is for the most part converted into purulent matter : But in erysipelas, the tumor is diffused, and not much elevated ; it seldom proceeds deeper than the skin ; any effusion with which it is attended is commonly thin and acrid, and not convertible into pus, and the skin acquires a kind of copper-colour instead of that crimson-red which occurs in the first stage of phlegmon.

By experience we know, that sores proceeding from erysipelas are difficult to cure : It should therefore be our first object to endeavour to prevent that effusion by which these sores are produced. Some indeed allege, that this practice must be attended with risk, as erysipelas for the most part appears to proceed from an affection of the constitution ; and hence we are advised rather to encourage the discharge

charge of that matter which nature in such cases seems inclined to deposit. This observation, however, is not confirmed by experience, for we find that the discussion of erysipelatous affections may be attempted with the same freedom and safety as inflammation of any other kind.

A common prejudice prevails against the use of unctuous and other moist applications in erysipelas ; and fine flour, starch, or hair-powder, are almost the only remedies employed externally. These are used with a view to absorb the acrid matter, which erysipelatous inflammation often throws out in the form of pustules, and which unctuous and moist applications are rather supposed to encourage. But to me it appears that they prove more useful in preventing the effusion or formation of that matter, than in absorbing it afterwards. By soothing or allaying that uneasy sensation which usually accompanies erysipelas, and which they often do very effectually, they necessarily tend to lessen that preternatural action

tion of the affected vessels, which in every case of inflammation we consider as the cause of the subsequent effusion; and as they usually prove more pleasant in every respect than moist applications, they should therefore in the first stages of the disease be preferred. It happens indeed in some cases, that they have little or perhaps no effect in procuring relief. In such instances, I have sometimes found, that by keeping the inflamed part exposed to the air, and wetting it every now and then with a feather soaked in a weak solution of saccharum Saturni, immediate ease has been procured, and no disadvantage has afterwards occurred from it. In general, however, the dry farinaceous powders answer better.

Almost an universal prejudice has prevailed against blood-letting and other evacuations in erysipelas. And as it is commonly supposed to be attended with some degree of putrescency, instead of evacuations, bark, wine, and warm stimulating cordials, have been recommended.

ed. It appears, however, that the ideas of practitioners upon this point have not been founded on observation: For it is now known, that blood may be discharged with the same safety in erysipelas as in other cases of inflammation; and by doing so, and adhering in every respect to an antiphlogistic regimen, we have it often in our power to prevent the disease from terminating in those effusions which we have mentioned, and which at all times we should endeavour to do.

It is proper, however, to remark, that local blood-letting, which in other varieties of inflammation proves often useful, is not here admissible: For the orifices by which the blood is drawn off are apt to degenerate into those troublesome ulcers, which erysipelas when it terminates in effusion, is very apt to produce.

By one or more general blood-lettings, according to the strength of the patient; by the use of gentle laxatives, mild sudorifics, and a cooling diet; and by frequently

quently dusting the part affected with one or other of the powders I have mentioned, almost every erysipelatous tumor may be discussed: But when effusion is found to have occurred in any considerable quantity, it should be discharged immediately by a small opening in the most depending part of it. In this state of the disease, emollient cataplasms are commonly applied with a view to bring the contents of the swelling to suppuration. This, however, proves always pernicious: For the effusion being of a nature which cannot be converted into pus, poultices can never be of the same use as in cases of phlegmon; and as it is commonly sharp and acrid, when allowed to remain, it is apt to do mischief by corroding the skin and other contiguous parts. The best applications in this state of the disease, are the saturnine ointments, such as Goulard's cerate, or the common wax-ointment, with a small proportion of *Saccharum Saturni*.



§ 2. *Of Inflammation of the Ear.*

THE passage, as well as the bottom of the ear, is entirely membranous; consequently the inflammation which attacks it proves always painful: For we know that inflammation of membranous parts gives more pain than that of parts of a looser texture; as the blood-vessels in the former do not yield so readily as those of the latter, to the distention with which inflammation is accompanied.

The remedies to be employed in inflammatory affections of the ear, should be regulated by the stage of the disease. When the inflammation has subsisted so long as to give reason to suspect that it will terminate in suppuration, which it is apt to do quickly, emollient applications prove most useful: The ear should be frequently fomented with warm emollient steams; and it often proves serviceable to cover the affected side of the head with large  
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emollient

emollient poultices. But in the commencement of the affection, we should in general attempt to prevent suppuration: For it is often difficult to obviate the effects of it when matter is once formed in the ear; and a long continued discharge is frequently productive of deafness. With this view, nothing proves in general so effectual as the application of a small blister behind the ear: And by pouring a few drops of laudanum into the passage, or of compound spirit of lavender mixed with a small proportion of oil, we very commonly have it in our power to remove or abate the pain; and the irritation being in this manner removed, the risk of suppuration is thereby lessened.

Our endeavours, however, for this purpose will often prove abortive: In which event, and when it is evident that matter is formed, we should endeavour to bring it off as freely as possible, by bathing the ear in warm water, and even by injecting a little warm water into it. By these

means we may often put a stop to the discharge: But when it still continues to flow, astringent injections, of lime water, or mild saturnine solutions, should be employed; which seldom fail when the disease is solely confined to the soft parts of the ear. When the bones of the ear are affected, which in general may be known by the matter having a very offensive smell, and being of a black or dark brown colour, all that art can do, is to keep the passage clear by the use of injections. The cure of deafness is in such cases not to be looked for, and we trust to nature alone for throwing out the diseased bones.

### § 3. *Of Angina.*

EVERY inflammatory affection of the throat is termed Angina, or Squinzy.

As abscesses in these parts prove always troublesome, and in some cases dangerous, we should endeavour to cure every inflammation with which they are attacked by resolution.

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With this view, one or more general blood-lettings should be prescribed, according to the strength of the patient. Smart purgatives prove particularly useful; and some advantage is often derived from diaphoretics.

None of these remedies, however, can be depended on with such certainty as the local discharge of blood from the part affected, and the application of a blister to the contiguous parts. In Plate LVII. figs. 1. and 3. instruments are delineated for the purpose of drawing blood from the throat by means of scarifications; and when employed with freedom on the first appearance of inflammation, suppuration may very commonly be prevented. Fomenting the throat with steams of warm vinegar proves sometimes useful; and considerable advantage has in different instances been derived from astringent gargles, of infusions of oak-bark, of red-rose leaves with a proportion of alum or vitriolic acid, and of *Saccharum Saturni* dissolved in water. A general prejudice prevails against

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gainst the use of saturnine applications in the form of gargles, from their being supposed to be of a poisonous nature. But although I have often used them, I never knew an instance of their doing harm; and they have frequently proved highly serviceable. In small quantities I believe they might be swallowed with safety; but we all know that gargles may be employed without any part of the liquor being allowed to go over.

It will often happen, however, that these and all other remedies will fail, either from their being applied too late, or from the inflammation being very violent. When suppuration is evidently to take place, it should be promoted by the external application of warm poultices to the throat, and by the patient being made to inspire the warm steams of milk, or of any emollient decoction, by means of the machine delineated in Plate LVII. fig. 2. When matter is fully formed, it should be discharged by an opening made into the abscess with one of the instruments mentioned above for scarifying the throat.



§ 4. *Of Inflammation and Abscess of the Liver.*

The substance of the liver being soft and of a yielding nature, we would not *a priori* imagine that it should be liable to inflame. We find, however, in warm climates, particularly in the East Indies, that this viscus becomes more frequently inflamed than perhaps any other of the body; probably from the bile in these climates being apt to become so acrid as to excite irritation in the parts to which it is applied. In some cases too, the liver inflames from external violence.

Inflammation of the liver is attended with a dull uneasy sensation over all the contiguous parts, with cholic pains and sickness at stomach; the patient is liable to frequent cold and hot fits; and for the most part, the colour of his skin, as well as his urine, is tinged yellow.

When suppuration takes place, and especially when the abscess is large, the patient complains of pain extending up the right side to the top of the shoulder.

In some cases this symptom occurs even in the inflammatory state of the disorder; but it happens more frequently after the formation of matter, probably from the weight of the abscess acting upon the diaphragm and pleura, with which the liver is connected. The region of the liver becomes daily more tense; and if the convex part of it is chiefly affected, a softness, and even a fluctuation of matter is often discovered through the teguments of the abdomen.

In the commencement of this affection, these remedies prove most successful, which prove most useful in other cases of local inflammation. Blood-letting should be immediately prescribed; the quantity to be determined by the strength of the patient: But instead of taking it from a vein, it should be drawn off by cupping and scarifying the part affected. When the scarifications are made of a sufficient depth, almost any quantity of blood may be got in this manner; and no remedy with which we are acquainted proves so effectual in  
removing

removing the inflammation. Blistering the pained part is also frequently of service; the bowels should be kept moderately open with mild laxatives; and a gentle perspiration should be encouraged over the whole body.

In general, this treatment will prove successful, when employed early in the disease; but when the symptoms do not soon yield, mercurials should be advised without any farther delay: For in the removal of inflammatory affections of the liver, nothing has hitherto proved so effectual as mercury in one form or another. The common mercurial pill of the Edinburgh Dispensatory answers as well as any other; and it seems to act with more certainty when conjoined with small doses of opium. Frictions with mercurial ointment upon the part affected, are sometimes employed with advantage: But whatever form of the medicine is used, it should be quickly carried so far as to affect the mouth, which should be kept moderately sore for several weeks, unless  
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the disease subsides immediately; in which case a shorter course will be sufficient.

As it is of importance in all cases of this kind to give a free discharge to the bile, if the patient does not otherwise get regular and easy stools, he should, during the mercurial course, have a gentle saline purgative every third or fourth day, by which the discussion of the inflammation is often much promoted.

Suppuration, however, will often take place, notwithstanding all that can be done to prevent it; and when found to have happened, an incision should be made into the abscess to discharge the matter. When the abscess is seated on the convex or prominent part of the liver, and the quantity of matter contained in it considerable, we readily discover it by the touch; and in this case there is no room to hesitate. But even where we have not this for our direction, a little attention will often enable us to discover with certainty whether suppuration has occurred or not. If along with pain in the right  
shoulder

shoulder and neck, it is observed that the region of the liver is more bulky than it was before, and that the corresponding teguments are become soft and œdematous; and especially if the patient complains of frequent shivering fits, a symptom which very constantly accompanies internal suppuration; we may conclude with much certainty that matter is formed.

Wherever an abscess is seated, the matter should be discharged, perhaps as soon as it is known that complete maturation has taken place. But abscesses in any of the larger cavities, especially when they lie so deep as the liver or any of the viscera, should be opened even before there is reason to suppose that all the effused fluids are so completely converted into pus as we might otherwise wish them to be. Indeed this should be considered as an established maxim in practice; for the chance of these collections bursting inwardly is much greater than of their opening outwardly, where the teguments which cover them are thick and strong, when  
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compared with the peritonæum, the only membrane lying between them and the intestines. Abscesses of the liver have been known to burst through the diaphragm, so as to be emptied into the thorax: In a few cases the matter has been carried into the duodenum by the common passage of the bile; and sometimes, by the great arch of the colon adhering to the liver, a communication has been formed between them; by which the matter of abscesses in this situation has been very completely evacuated: But for the most part, when not discharged by an external opening, the abscess bursts into the abdomen.

With a view to prevent such a fatal occurrence, the assistance of surgery should be immediately desired as soon as the appearances and symptoms we have mentioned give cause to suspect that matter is collected: An incision of a sufficient length should be made with a scalpel through the external teguments in the most depending part of the tumor; and on reaching the  
abscess,

abscess, it may either be opened with the point of the scalpel, or with a lancet ; but piercing it with a trocar is preferable, as in this manner we have it in our power to evacuate the matter slowly and gradually, which in large collections is a point of importance; and therefore merits attention. Even this opening into the abscess, however, should be afterwards enlarged, otherwise there would be some risk of its closing before the cyst containing the matter collapses sufficiently for the prevention of farther collections. This being done, a pledgit of soft lint covered with any emollient ointment, or merely dipped in oil, should be gently insinuated to a sufficient depth between the lips of the wound, to prevent them from uniting till the abscess collapses and fills up from the bottom ; a process that will be much hastened by a proper application of pressure upon the tumefied parts, by means of a flannel roller passed two or three times round the body.

When the vacuity produced by the discharge of matter does not soon fill up, it  
will

will be proper to introduce a canula to preserve a free passage for any matter that may afterwards form. But this precaution is seldom necessary ; for abscesses in the liver heal sooner, and with fewer inconveniencies, than similar affections in perhaps any other part of the body. Indeed this is so well ascertained, that I would advise an opening to be made into the abscess in every instance where there is the least cause to suspect that matter has formed in the liver. Many practitioners indeed assert, that no attempt of this kind is admissible unless the abscess is seated in the convex part of the liver. It must be allowed, that abscesses in this situation are much more accessible than such as are seated in the concave part of it. But wherever they are situated, a proper vent should be procured for the matter ; for if not evacuated by an external opening, we may conclude almost with certainty, that it will be emptied into the abdomen, by which the patient will inevitably die.

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In all affections of the liver that occur in warm climates, the bark is commonly employed on the first appearance of any of the symptoms: The putrescent tendency of the bile is the ostensible reason of this. But I believe it will be found, that no dependence should be placed upon the bark during the first or inflammatory stage of this disease. In this period of the disorder it may even do mischief; but when suppuration has taken place, and when the matter is discharged from the abscess, bark proves equally useful, as in similar affections of other parts of the body.

When, by too long delay, it unfortunately happens that an abscess either bursts into the cavity of the chest or into the abdomen, the matter should be drawn off immediately; in the one case, by the operation of the empyema, described in Chapter XXVI.; and in the other, by the common operation of the paracentesis, Chapter XXV.

§ 5. *Of Inflammation and Abscesses in the Breasts of Women.*

THE breasts of women are liable to suffer from the same causes which excite inflammation in other parts of the body; but abscesses in the breast occur most frequently in nurses by the gorging or stoppage of the milk, which almost constantly takes place from sudden or imprudent exposure to cold: The breast becomes stiff, swelled, and painful; the milk runs off in small quantities, but not so as to afford effectual relief; and the patient grows hot and restless, while much thirst prevails, accompanied with a full quick pulse.

Practitioners are divided with respect to the treatment best suited to cases of this kind: By some it is said, that milk tumors of the breast should always be discussed; while others assert, that when this practice does not succeed, it often does mischief, by inducing swellings of a schirrous nature, which cannot afterwards be  
3 dissolved,



dissolved, and which are apt to terminate in cancer.

In judging of this point, from my own observation, it does not appear to me that there is room for doubt: Our practice in inflamed breasts should be the same as in every case of inflammation, wherever it is seated. In the first stages of the disorder, discussion of the tumor should be always attempted; while it would be in vain, and highly improper, to advise it when the swelling has been of such duration as to have any tendency to suppurate. The risk of our inducing schirrus by this practice, seems to be in a great measure imaginary: It rather appears, indeed, that cancer is more apt to occur from the improper management of those sores which ensue from collections of matter in the mamma, than from any means that can be used to prevent the matter from forming. We are farther induced to follow the practice, from the great distress which always attends suppuration in the mamma: Indeed, the pain and misery of the

patient is in such cases often so great, that no doubt can remain with unprejudiced practitioners of the propriety of endeavouring in every case to prevent it.

It is scarcely necessary to remark, that the same remedies prove useful here, that succeed in the discussion of inflammation in other parts: But it is truly surprising, that there should be almost an universal prejudice in every inflamed breast against the most powerful of all discutients, blood-letting. Afraid of this evacuation tending to diminish the quantity of milk, we avoid it entirely. In this, however, I am convinced we are wrong. In every case of this kind, I have been in the practice of bleeding freely. It has not appeared to diminish the flow of milk; while its effects in preventing suppuration, are, for the most part, evident. The quantity of blood to be taken away, must always be determined by the violence of the inflammation, and strength of the patient: But, in general, the practice will be more effectual, when as much as the patient can bear

to lose, is taken at once, than when the same, or even a greater quantity, is taken at different times. Purgatives prove particularly useful; and a cooling diet is equally necessary here, as in other cases of inflammation.

As nothing tends more to prevent the discussion of inflamed tumors than pain, nothing should be omitted that can tend to remove it: And as no remedy proves so effectual as opium, it should always be given, and in such doses as are sufficient for the purpose. With a view to remove the tension of the breast, the parts should be gently rubbed with althea ointment, or with oil: But the applications upon which most dependence is to be placed, are those of a cooling astringent nature; such as a solution of sal ammoniac in vinegar and water; spiritus Mindereri; and all the saturnine applications. Cloths dipped in any of these, should be kept constantly applied to the breast; by which, and by attention to the other parts of the treatment already advised, almost every tumor

of this kind may be removed, unless the inflammation has been of long duration; in which case, when the pain and tension are considerable, it is more advisable to endeavour to bring the tumor to suppurate, than to attempt any other method of cure. For this purpose, we rely with most certainty on a frequent renewal of warm fomentations and poultices; and when matter appears to be fully formed, it should be discharged by an opening made in the most depending part of the collection: At least, an opening should always be advised, when it is found that the matter is pointing at an improper part, where it would not find a free vent.

In the treatment of inflamed breasts, which occur in nursing, it is a doubt with many practitioners, whether the milk should be drawn off or not. Indeed many assert, that drawing it off, either by continuing the child or with glasses, does mischief; and therefore they advise it not to be attempted. I have never observed, however, that any inconvenience ensued from

from it ; and as it always procures relief, I advise it in every instance. When the breast is much swelled, the nipple cannot be laid hold of by the child : In such cases, the glasses represented in Plate LXVII. may be used with advantage.

§ 6. *Of Inflammation of the Testes.*

INFLAMMATION of the testes may be induced in various ways : By the application of cold ; by external violence ; and by every other cause that tends to excite inflammation in other parts of the body. But the most frequent cause of it is gonorrhœa virulenta. The common opinion respecting this was, that it occurred from the matter in gonorrhœa falling down, as it was termed, upon the testes : And this appeared the more probable, from its being observed that the testes were apt to swell upon the discharge being stopped, at the same time that the infection of the testes was commonly relieved by a return of the running.



It is now known, however, that no communication subsists between the urethra and testes, by which matter can be conveyed from the one to the other: And the most probable opinion is, that in the swelled testes from gonorrhœa, the inflammation is communicated from the urethra, and spreads along the vasa deferentia to the testes.

A sudden stop being put to the discharge, whether by the use of irritating injections, or by any other cause, is very commonly attended with an increased degree of inflammation: to abate which, nothing proves more effectual than a return of the running. In this way, we account more clearly than in any other, for the effect produced upon the testes by the state of the running.

Inflammation of the testes very rarely terminates in suppuration: But this should not prevent the most timely application of those remedies which we know to be the most powerful discutients. Blood-letting is perhaps the most effectual

tual remedy ; but it always proves most serviceable when the blood is taken directly from the part affected by means of leeches. After discharging a sufficient quantity, the swelling should be kept constantly moist with a solution of Saccharum Saturni ; the scrotum and testes should be properly suspended ; the bowels should be kept moderately open ; a low diet should be prescribed ; and the patient should be strictly confined to a horizontal posture. When there is cause to suspect that the constitution is tainted with lues venerea, nothing will prove serviceable if a mercurial course is neglected. And when it appears that the disease has been induced by the discharge having been too suddenly checked, we should endeavour to promote a return of it, by bathing the penis in warm water ; by injecting warm oil into the urethra ; or by the use of bougies.

In this manner, we scarcely can fail of removing inflammation of the testes by discussion : But when the contrary happens, either from the use of the remedies

not being duly persisted in, or from the inflammation being particularly violent, and when suppuration is found to have taken place, the matter must be discharged by an opening made in the most depending part of the abscess; which in every respect should be treated like collections of pus in other parts of the body.

### § 7. Of *Venereal Buboes*.

SWELLINGS of the lymphatic glands from the absorption of the venereal virus are termed Venereal Buboes. They may appear in any gland seated between a venereal sore and the heart: But they are most frequent in the groin, in consequence of the absorption of venereal matter from sores in the penis. For the most part they are produced by matter absorbed from chancres, and in some cases the glands swell from sympathy in gonorrhœa: But instances likewise occur of buboes arising without any previous ulceration

tion or discharge from the penis, where the matter appears to be absorbed without any perceptible erosion of the skin.

The most material point to be determined in the treatment of bubo is, whether we should endeavour to discuss the swelling, or bring it to suppuration? While the opinion prevailed that buboes were produced by the deposition of venereal matter from the system, it was not surprising to find practitioners advising us in every instance to promote their suppuration: For on this supposition it was probable that nature meant by these swellings to throw off the infection. But now when we know that buboes arise from matter passing into the system, that the quantity of venereal matter is increased instead of being diminished, by their being brought to suppurate; and that the sores which ensue from them are often very difficult to cure; scarcely any will doubt of the propriety of endeavouring to remove them by discussion.

With this view the patient should be put upon an antiphlogistic regimen. His  
bowels

bowels should be kept open by the use of purgatives ; leeches should be applied to the hardened gland ; and it should be kept constantly wet with a strong solution of saccharum saturni. Along with these, however, mercury should be given in quantities sufficient for eradicating the disease : And as we know from experience that mercury proves most effectual when made to pass through the diseased glands, it should always be applied in the form of unction to those parts in which the lymphatics of the affected glands are known to originate : A practice which will almost always be found to prove more effectual than the direct application of mercury to the glands themselves. Thus in the discussion of a bubo in the groin, friction with mercurial ointment upon the thigh and leg will prove more successful than rubbing it upon the gland itself. To many this has been long known ; and it would appear that the practice could scarcely fail of occurring to any who have paid attention to the discoveries ;



coveries made by the moderns in the anatomy of the lymphatic system.

When buboes are early noticed, the course we are now recommending will seldom fail in discussing them, if the mercurial frictions are properly applied and continued for a sufficient length of time. It often happens, however, that all our efforts fail, either from the disease being too far advanced before the mercury is applied, or from the tumor not being altogether venereal, but of a mixed nature; a circumstance which is not unfrequent. Thus, it frequently happens that buboes are combined with scrophula and scurvy, and in some cases with erysipelas or with common phlegmon. In such cases we are not surprised at the failure of mercury: And accordingly we sometimes find, that instead of forwarding the discussion of the swelling, it tends rather to bring it to suppuration. Cases of this kind prove often very perplexing both to the patient and practitioner; so that no point in  
practice

practice requires more exact attention and discrimination : For by proceeding to throw in great quantities of mercury, as is usually done while buboes remain obstinate, we often do harm, not merely to the local affection, but to the system at large ; at the same time that in every instance the safety of the patient requires such a quantity to be exhibited as is sufficient for eradicating the venereal virus. In all such cases, the best practice, I believe, is to desist from the use of mercury as soon as it appears that no advantage is derived from it. In the mean time, by a change of diet and other circumstances, such an alteration may be affected in the constitution, that a second trial of mercury may prove successful : At least, in different instances, this has succeeded with me, where I had much reason to think that persisting longer with mercury at first would have done harm.

When it is found that a bubo cannot be dissolved, and that it will probably suppurate, a frequent renewal of warm emollient

lient poultices and fomentations are the remedies to be most depended upon.

The opening of buboes when suppuration has taken place next demands our attention. Some dissuade us from opening buboes at all, alleging that they heal sooner when allowed to burst of themselves, : While a small puncture with a lancet, a longitudinal cut through the whole extent of the swelling, or the application of caustic, have all had their abettors.

When a bubo is altogether venereal, and not connected with any other affection, any of these methods will succeed, provided a sufficient quantity of mercury is exhibited : But when a bubo terminates in a sore difficult of cure, we are too apt to blame the particular method in which it was opened ; for in whatever manner it is done, we know that the cure will often prove tedious and perplexing.

The object of practitioners should be nearly the same here as in collections of matter in any other part. Such an opening

opening should be made as will afford a free vent to the matter : But there is seldom any necessity for making it larger. In large buboes, indeed, the teguments are apt to be so loose and flabby, and the texture of the skin so much destroyed, that the cure would be rendered tedious were it allowed to remain. In such cases it is advisable to discharge the matter with caustic applied in such a manner as to destroy any part of the teguments that appear to be superabundant. This, however, is seldom necessary ; and for the most part it will be found that an opening made from the centre of the tumor, where the matter commonly points, down to the most depending part of it, will prove sufficient. Even a smaller opening than this would often answer ; but it is better to make it of a sufficient size at once, than to be obliged to repeat a very painful operation perhaps once and again, as is often necessary when buboes of a large size are opened by small punctures. In small buboes, a mere  
puncture

puncture will sometimes prove sufficient ; nay in these, the matter being allowed to burst, often answers extremely well : But when the collection is large, this should never be depended on.

When buboes come forward to full maturation, without much injury being done to the skin, I have in different instances discharged the matter by the introduction of a small cord ; and the practice has succeeded. This requires, however, the teguments to be firmer than they commonly are when a bubo is ready to be opened.

We all know that it is of much importance to prevent the air from finding access to sores ; and as we sometimes observe buboes ooze out the matter which they contain by a number of small openings over their surface, and as these commonly heal easily, I conclude that they do so from the openings being so small as to exclude the air entirely. In different cases, I have with this view attempted to imitate nature, by making a number of  
small



small punctures with the point of a lancet over the whole extent of the bubo ; and for the most part with success. The matter comes slowly off ; the sides of the abscess contract gradually ; and when completely emptied, we commonly find the whole parts that have been affected, sufficiently firm, without any sores or sinuses remaining.

While means are employed to promote the suppuration of a bubo, the patient should still continue the mercurial course, by which no time will be lost ; and the sore, which is the consequence of the opening, will afterwards heal more quickly than if the mercury had been interrupted. The sore, however, often proves tedious, even where we are convinced that a sufficient quantity of mercury has been given, and where there is reason to suppose that the syphilitic virus is eradicated. The edges become hard and livid ; the matter thin, sharp, and fetid ; and instead of healing, the ulceration gradually becomes more extensive ; or if it heals in some parts, it breaks out in others,.

thers, giving a honey-comb appearance to all the under part of the abdomen and upper part of the thigh.

The situation of patients with such sores is truly deplorable. The pain with which they are attended is often intense; the absorption of acrid matter induces hectic fever; the patients become hot and restless through the night; and almost a total want of appetite renders them soon much emaciated.

As I have happened to be concerned in a considerable number of such cases, I can speak with some confidence of the method of treatment. In the first place, we are here to suppose, that the patient has taken a sufficient quantity of mercury, and that no sinuses are left, in which matter in any quantity will be allowed to lodge. Cicuta, in such circumstances, has sometimes proved useful; and I have had different instances of the the sores being healed by the external application of it when no advantage was derived from any of the usual dressings. In such cases, it was applied

in the form of poultices, by mixing the juice of the fresh herb with the common emollient cataplasim. I have sometimes observed too, that in the internal exhibition of cicuta, the recent expressed juice has proved more effectual than any other form of it. I have given the hyoscyamus and belladonna very complete trials in various instances; but commonly with no material advantage. Sarsaparilla, guaicum, and mezereon, all prove useful here; and they seem to act with most advantage, when used all at the same time: guaicum and mezereon prove even serviceable when used separately; but I have, in different instances, found that they act with more advantage, when combined in the following form with sarsaparilla:

℞ Rafur. ligni guaiac. ʒss.  
Radicis sarsaparillæ, ʒifs.  
Corticis radicis mezerei, ʒi.  
Radicis glycyrrhizæ, ʒiii.  
Aq. fontanæ, lbiii. coque ad lbii.  
Colaturæ adde  
Syrup. althææ, ʒi

This.

This quantity to be used daily, by drinking a cupful from time to time.

But the most effectual course I have hitherto tried, is the application of caustic round all the edges and hardened parts of the fores, at the same time that opium in considerable quantities is given inwardly. For a considerable time, I trusted entirely to dressings of the emollient kind, being afraid of irritating parts already highly sensible. In some cases, a saturnine ointment has proved successful; and in others, the common calamine cerate has answered; but for the most part, on those days in which caustic is not applied, I have found more advantage from the use of red precipitate, than from any other remedy. In some cases, it is necessary to sprinkle it over the surface of the sore, in the form of a dry powder; but in others, it proves sufficient to add it to any of the common ointments. Instead of creating pain, it commonly removes it; and it seldom fails to alter the discharge from a thin sharp sanies to a thick well digested pus. Mu-

cilage of gum arabic, impregnated with calomel, sometimes answers in the healing of these sores, when the usual dressings fail: A drachm, or even more, of calomel may be mixed with one ounce of thick mucilage.

Lunar caustic, at first, sometimes gives pain; but this soon subsides, especially when opium is used at the same time. Indeed, opium of itself proves often useful in these sores. It has been highly extolled of late for the cure of every stage of the venereal disease. I have had no proof of its ever curing any symptom truly venereal; but I have had several instances of sores remaining after the venereal disease, being completely removed by it, where large quantities of mercury had previously been given in vain. It often appears that these sores, as well as others proceeding from different causes, are kept up by that pain and irritation with which every are accompanied when the matter is thin and acrid. Opium, by removing this state of irritability, seems to destroy  
the



the disposition in the vessels of the fore to form that kind of matter which, by its own acrimony, serves to perpetuate itself; and this being accomplished, if no other interruption takes place, nature alone will seldom fail to complete the cure. If this idea is well founded, there can be no necessity for giving opium in such large quantities as of late have been advised. On the supposition of opium being possessed of some specific powers in the cure of the venereal disease, it has been given in as large doses as the patient could possibly bear; and by beginning with small doses, and increasing them gradually, there have been instances of its being taken to the extent of half a drachm or more, two or three times a day. I have not heard, however, that any advantage has been derived from it in those large quantities, that did not accrue from a more moderate use of it: And in the course of my own experience, I have found it equally effectual, when it merely lessened or removed pain, as when given in the largest doses; while

the inconveniencies which usually arise from these have never been of any importance \*.

§ 8. *Of Lumbar Abscesses.*

EVERY collection of matter seated on any part of the loins, may be denominated a Lumbar Abscess. But it is that variety of the disease we are now to consider, which originates about the superior part of the os sacrum; and in which we find, by dissection, that the matter contained in a cyst, is lodged on the anterior surface of the internal iliac and psoas muscles.

These abscesses are preceded by pain and tension over the loins; which often shoots up along the course of the spine, and down towards the thighs; and is frequently

\* A more particular account of buboes, and of the sores which ensue from them, may be seen in a treatise which I have newly published on the venereal disease, than could with propriety be inserted here.

quently accompanied with difficulty of standing in an erect posture. In some cases, these symptoms are suspected to be nephritic ; but for the most part the disease assumes the appearance of lumbago. When suppuration ensues, shivering fits are apt to occur : But the pain, which at first was acute, becoming dull and less perceptible, the patient is led to conclude that he is getting better, till the matter, after falling down in a gradual manner behind the peritonæum, is observed to point outwardly, either at the anus by the side of the rectum, or on the upper and fore part of the thigh, where the large blood-vessels pass out, beneath Paupart's ligament, from the abdomen.

When the matter takes the course of the gut, and appears near to the anus, it either soon bursts, or is laid open on the supposition of its being an abscess originating in the contiguous parts. But when it passes down with the fœmoral artery, which we find to be most frequently the case, as it lies deep, and is cover-

ed with the strong tendinous fascia of the thigh, instead of pointing at any particular part, it falls gradually lower till in some cases it reaches near to the joint of the knee. In some I have known these abscesses first appear immediately within the spine of the ileum, and the matter burst out above the os pubis, but in general before bursting, it falls farther down upon the thigh.

The tumor is seldom attended with more pain than might be expected to occur from the distention of the fascia and contiguous parts by the matter collected beneath. There is no discolouring of the skin; the teguments, for the most part, retaining their natural appearance to the last. A fluctuation of a fluid is evidently discovered through the whole extent of the tumor, particularly when the patient is erect: For at this time the swelling is always more tense than when the body is lying in a horizontal posture, when a considerable part of the matter runs along the sac towards its origin in the loins.

We

We have already observed, that this variety of abscess, when the matter falls down towards the anus, may be mistaken for a common phlegmon originating in the neighbourhood of the rectum. But no farther inconvenience can occur from this mistake, than that the sore, which ensues from laying it open, or from the matter bursting out, will not so readily heal as when the disease is local: And it is probable that this is one cause of abscesses in these parts being in some instances so difficult to cure. But in the more ordinary form of the disease, where the matter falls down beneath Paupart's ligament, the tumor exhibits appearances so similar to those of a crural hernia, that the one has often been mistaken for the other. Of this I have seen different instances, even where practitioners of experience were deceived. This proceeds, however, from inattention; for the two diseases may be clearly distinguished from each other.

The



The history of the rise and progress of the swelling should be first attended to. A crural hernia usually appears suddenly, after some unusual exertion, and without any previous symptom; for the most part it is attended with obstruction to the passage of the fæces, with vomiting, and other symptoms of hernia; and from the first, the tumor is attended with pain on being handled. But in the lumbar abscess, before the matter appears at the top of the thigh, the patient is previously distressed with symptoms of inflammation over all the under part of his back and loins. No obstruction of the bowels takes place, nor any symptom of hernia; and the patient admits of the tumor being freely handled. In the crural hernia, the swelling seldom arrives at any considerable bulk; and when it does become large, it is by slow degrees: No fluctuation is perceived in it; but, on the contrary, it feels either soft like dough, or knotty and unequal, according as the omentum or fæces contained in it have been  
been

been long lodged in it or not. But in lumbar abscesses of this kind, the tumor commonly falls quickly down the thigh for the space of several inches ; a fluctuation is always perceived ; and no inequalities are observed in it. In hernia, even when not strangulated, some degree of pressure is usually necessary to make the contents of the tumor recede. But in the lumbar abscess, the tumor becomes flaccid immediately on the patient lying down, whether any pressure is applied to it or not : And it often happens, when the matter has fallen any considerable way down the thigh, that the upper part of the cyst at the top of the thigh is found perfectly clear ; that is, a certain space can be discovered between the upper part of the matter and the inferior border of the abdominal muscles, which can never be done in any kind of hernia ; and which, therefore, in this state of the disease, is always a certain means of distinction. It is scarcely necessary to observe, that in this kind of examination  
the

the patient should be put into different postures.

By due attention to these circumstances we may always distinguish one of these tumors from the other. Both indeed may occur at the same time in the same thigh, by which a mixture of appearances will be produced. This, however, must be extremely rare; and when it does take place, as the matter of the abscess and the parts protruded from the abdomen will always be contained in separate sacs, the combination will for the most part be easily discovered.

In the treatment of these affections, the period of the disease first requires attention. While the inflammatory state continues, the strictest antiphlogistic course should be adopted, in order if possible to prevent the formation of matter. For the most part, we discover, that it has been induced by some injury being done to the small of the back or loins, not unfrequently by a twist in wrestling; by carrying a heavy load, or by a severe bruise; and if accidents of this nature  
were

were immediately treated with that attention which their importance merits, those disagreeable consequences which are apt to ensue from them might frequently be prevented. Whenever a patient, who has suffered in this manner, complains of severe pain in the injured part, blood-letting should be immediately advised; and as local blood-letting proves always in such cases most effectual, it should be done by cupping and scarifying the pained part. The affected parts being deeply seated, the lancets of the scarificator should be made to go to a considerable depth; for which purpose the spring of the instrument should be stronger than usual, by which means any quantity of blood we may judge proper may be taken with ease; and I am convinced, that by carrying this practice a sufficient length, we might very commonly, in the early stages of the disease, remove it entirely. It is difficult to say when injuries of these parts would terminate in suppuration or otherwise; but I have met with different instances, where,  
from

from the severity of the pain and other symptoms, there was much cause to suspect that matter would have formed, if it had not been prevented by a timely and plentiful discharge of blood from the injured parts; a remedy which commonly gives immediate relief to the pain, however violent it may be. But at the same time that we depend chiefly on local blood-letting, other remedies which experience shows to prove useful in inflammation should not be neglected: Of these, blisters, opiates, and gentle purgatives are most to be relied upon.

These, however, as well as every other remedy, will in some instances fail; and in others, practitioners are not called till suppuration has taken place, and till the matter has actually begun to point, either in the neighbourhood of the anus, or on the fore part of the thigh. In this situation, what are we to do? Are we to allow the matter to remain, or to discharge it by making an opening into it? In my opinion there is no room for hesitation: The

matter:



matter should be evacuated as soon as a fluctuation is distinctly perceived in the tumor.

I know, however, that practitioners are of different opinions upon this point: For it is alleged, that as these abscesses are so deeply seated, it would be in vain to attempt the cure of them; and therefore that no advantage can be derived from laying them open; while much harm, they observe, may accrue from the air being freely admitted to them. But it does not appear that this reasoning is founded on observation. I have always held it as a leading principle in surgery, that the matter of every abscess, seated upon or near to any of the large cavities of the body, should be discharged as soon as its existence is clearly ascertained: So that in the treatment of the lumbar abscess, I have uniformly given vent to the matter, and without any bad consequences ensuing; while much mischief may occur from this being omitted. We find by dissection after death that these abscesses, when  
of

of long duration, affect not only the softer parts covering the vertebræ of the loins, but the substance of the vertebræ themselves; which in some cases have been found carious, and even partially dissolved in the matter of the abscess. Now these accidents are surely more likely to happen when the matter is allowed to continue in the abscess, than when discharged early: At the same time, by emptying the sac, the matter is prevented from bursting into the cavity of the abdomen: Which in different instances has happened, to the great inconvenience and hazard of the patient. The matter, however, ought certainly to be discharged in such a way as to prevent the air as effectually as possible from getting access to the cavity of the abscess. With this view a trocar may be used with advantage. By pressing the matter down to the most depending part of the abscess, the skin is made so tense, that a trocar is readily introduced. I tried this in one case with very complete success; and the patient wore a small canula in the opening

ing for several months, by which the matter was freely discharged: But when the case is not perfectly obvious, and where any doubt remains of the contents of the tumor, instead of pushing a trocar into it, the opening should be made in a slow gradual manner with a scalpel, in the same manner as is practised in cases of hernia; so that in the event of any of the contents of the abdomen being down, no injury may be done to them.

After the matter has continued to flow for some time, and if at the end of two or three weeks the quantity does not become considerably less, it may prove useful to throw up with a syringe a weak solution of saccharum saturni, lime-water, or any other gentle astringent; by which the discharge will be gradually diminished, and at last may cease entirely. But although this should never happen, and although the patient, during life, should submit to the inconveniency of a constant stillicidium of matter from the sore; yet even this would be preferable to the risk

of allowing every abscess of this kind to remain unopened.

As I have happened to meet with many instances of this disease; as practitioners are divided in opinion respecting it; and as no distinct account of it is given by authors; I have therefore judged it proper to speak of it more fully than otherwise might have been necessary.

§ 9. *Of the Paronychia or Whitlœ.*

THE paronychia is a painful inflammatory swelling, occupying the extremities of the fingers, most frequently under the nails.

Several varieties of this disease are described by authors; but three only require to be distinguished, and even these are all of the same nature, the one being only more deeply seated than the others.

In the first, the patient complains of an uneasy burning sensation for several days over the point of the finger; the part becomes tender and painful to the touch; a  
slight

slight degree of swelling takes place, but with little or no discoloration; and if the inflammation be not removed by resolution, an effusion is at last produced between the skin and parts beneath. On discharging this by an incision, it appears to be a thin, clear, acrid serum; and the patient, in general, gets complete relief by the operation.

In the second variety of the disease the same set of symptoms take place; only the pain is more severe, and attended with some uneasiness over the whole finger and hand. The effusion of matter is not so perceptible as in the other; and on laying it open, it is found to lie beneath the muscles of the finger, between these parts and the periosteum.

And in the third, the pain is still more intense in the point of the finger, at the same time that the whole hand and arm becomes stiff, swelled, and painful. The lymphatics leading from the finger, and even the glands in the arm-pit, swell and inflame; and on making an incision into



the effusion, it is found to lie between the periosteum and bone, the whole corresponding phalanx being in general carious.

Swellings of this kind may be produced by various causes. They frequently occur from external violence, particularly from punctures and contusion: But they happen more frequently without any obvious cause, and without our being able to account for them.

Two sets of remedies are employed in paronychia: The one consists of fomentations, poultices, and other emollients; the other of ardent spirits, vinegar and other astringents.

As we find from experience that no advantage is derived from the effusion which occurs in this disease; on the contrary, that it is always productive of much additional pain, all those applications should be avoided which have any tendency to promote it. Some practitioners have been induced to employ warm emollient poultices on the first appearance of the swelling

ling. This they do with a view to promote suppuration ; but I have never observed that any advantage accrues from it. The matter of a whitloe is never of the purulent kind, nor is it ever converted into pus, or rendered mild by poultices, or any other remedy. We should endeavour therefore in every instance to prevent it from being effused ; and this is done with most certainty by local blood-letting, and the use of astringent applications. Indeed the same remedies prove most effectual here, that we find to be so in the removal of inflammation in other parts. In various instances, I have found even severe degrees of pain almost immediately removed by the application of leeches over the diseased phalanx of the finger. But in the more violent degrees of pain, where the arm swells, and especially when fever takes place, general blood-letting becomes likewise necessary, at the same time that large doses of opiates are indicated.

After as much blood is discharged by leeches as is judged proper, the immer-

sion of the pained parts in strong brandy, or even in spirit of wine or alcohol, is one of the best remedies: And when the bites are somewhat healed, or when leeches have not been employed, spirit of turpentine or strong vinegar may be used in the same manner.

It is proper, however, to remark, that it is in the first stages only of this affection that remedies of this kind can prove useful: For when effusion has actually taken place, that state of the disease is produced which they were meant to prevent; and it does not appear that they have any effect in removing it. As soon as we are convinced that effusion has occurred, an opening should be made without delay: For we have already observed, that it is in vain to attempt to convert the effused fluid into pus; and being in itself acrid, it is apt to injure the contiguous parts, while at the same time the patient is kept in an extreme degree of pain as long as it remains confined. When the collection is superficial, and  
merely

merely covered with skin, this is a very simple operation. A puncture with a lancet commonly proves sufficient: But when the matter is more deeply seated, it requires some attention to avoid the flexor and extensor tendons of the finger.

When the matter lies above the periosteum, all that we have to do is to make the opening sufficiently large for discharging it, and to dress the sore as if it was produced by any other cause. But, when the matter lies between the periosteum and bone, the latter is always rendered carious: Hence it is the common practice to endeavour to keep the incision open till an exfoliation of the diseased parts of the bone takes place; but I have never observed any advantage accrue from this. The process is not only extremely painful, but tedious. The matter is apt to lodge beneath the nail; painful fungous excrescences sprout out over the sore, which it is difficult even with the strongest caustic to keep down; and at last it very commonly happens, af-

ter the patient has suffered several months of distress, that instead of a partial exfoliation, the whole diseased phalanx comes away. I am therefore convinced, that much time and trouble would be saved both to the patient and surgeon, if the diseased bone was immediately removed on making the opening to discharge the matter. By making a free incision along the whole length of the diseased phalanx, the bone is easily removed with common forceps. The pain attending it is indeed severe, but it is only momentary : And the measure, which does not deprive the patient of the use of the joint so much as might be imagined, is seldom opposed when the surgeon advises it. I have had several instances of people who in this manner lost the last phalanx of bone in one finger, having such a degree of firmness in the parts which remained, as to suffer very little inconvenience from the want of it.

When the diseased bone is removed, the remaining fore commonly heals easily. It  
requires



requires some attention, however, to preserve the lips of the sore from adhering till it fills up from the bottom. This is most easily done by insinuating between them at each dressing a small pledgit of soft lint, spread with any mild emollient ointment.

In almost every variety of paronychia, the nail is apt to fall off: But this proves only a temporary inconvenience; for when the parts are properly protected, nature never fails to supply the deficiency.

In the commencement of paronychia, the last phalanx of the finger only is affected: And to whatever extent the pain and swelling of the softer parts may spread, we seldom find that the bone of the contiguous phalanx suffers, unless from improper management in allowing the diseased bone to remain, or the acrid matter to lodge too long. In such cases, the surrounding teguments are apt to swell and inflame, and small ulcerations to occur over the whole extent of the carious bone. In this situation we are often  
under

under the necessity of advising the finger to be amputated, in order to prevent the disease from spreading to the hand.

§ 10. *Of Chilblains.*

THESE are painful inflammatory swellings, to which the fingers, toes, heels, ears, and other extreme parts of the body, are liable, on being much exposed to severe degrees of cold. The tumor is for the most part of a deep purple, or somewhat of a leaden colour: The pain with which it is attended is not constant, but shooting and pungent; and in general, it is accompanied with a very distressful degree of itching. In some cases the skin remains entire, even although the tumefaction is considerable; but in others it bursts or cracks, and discharges a thin fetid matter. And where the degree of cold has either been very great, or the application of it long continued, all the parts that have been affected are apt to  
mortify

mortify and slough off, by which a very foul ill-conditioned ulcer is always left.

We have observed above, that it is the extreme parts of the body chiefly that are liable to be attacked with chilblains : And we likewise find, that they are more frequent in delicate children and old people than in those who are robust. It is also remarked, that they are particularly severe in people of scrophulous constitutions.

The best preventative of chilblains is to avoid exposure to cold and dampness ; for when once a person has suffered from swellings of this kind, if the injured parts be not protected by sufficient coverings, they are apt to return every winter. Much distress, therefore, and inconvenience, may be prevented by due attention to this circumstance.

Chilblains may be considered as a lesser degree of what is usually termed frost-biting : Hence parts attacked with them should never be quickly warmed. The patient should not be allowed to approach a  
fire :

fire : Instead of which, he should be put into a cold apartment ; and the frost-bit parts should be first well rubbed with snow when it can be procured, and afterwards immersed in cold water. Nothing proves so certainly hurtful to parts in this state as heat suddenly applied. Even snow and cold water afford a warm sensation to parts attacked with chilblains ; but it is found by experience that no detriment ensues from this. After the parts have been treated in this manner, the patient may in a gradual way be brought into a greater degree of heat ; but he should for a considerable time be kept at a distance from fire. Rubbing the parts with salt will in this situation prove useful ; and immersion in warm wine is likewise employed with advantage.

A patient much benumbed with cold should not even have cordials given to him suddenly. A glass of cold wine may at first be allowed. Afterwards warm wine may be given, either by itself or mixed with any of the warmer spices :  
And

And when stronger cordials are required, ardent spirits may be employed.

Remedies of this kind, however, are only necessary in the more severe degrees of these affections. In common cases of chilblains occurring in this country, as soon as the part is perceived to be affected, it should be well rubbed either with spirit of turpentine, or camphorated spirit of wine; and pieces of soft linen moistened in one or other of these should be kept constantly applied to it. In this manner we have it often in our power to remove swellings which otherwise would be productive of much distress: But we must again observe, that the best advice that can be given to patients liable to chilblains, is to protect the parts much exposed to suffer from cold as much as possible during the winter; and when by accident they get wet with snow, which proves more particularly hurtful than moisture of any other kind, that they should be dried as quickly as possible.

As some patients suffer severely with chilblains every winter, our being able to prevent



prevent them without that inconvenience, which always attends confinement and much caution, would often be an object of importance; and it is a point upon which practitioners are frequently consulted. In different instances I have found sea-bathing during summer prove useful, and in one patient who had suffered severely from the effects of cold for several winters, I advised a chamber-bath to be used even during winter; by which the parts which used to suffer were so much strengthened, that several years have elapsed without any return of the disease.

When chilblains ulcerate, by the teguments being altogether thrown off, or merely cracking and oozing out matter, warm poultices and emollient ointments are commonly employed. For the purpose of cleansing the sores, and inducing a discharge of right matter, poultices may with propriety be advised for a few days; but they should never be long continued: Nor should emollient ointments be much persisted in; for they very universally induce

duce fungous excrescences over the fores, which are often difficult to remove. The daily application of caustic to the edges of the fore, and dressing the fore itself with common digestive ointment, mixed with a due proportion of red precipitate, are the best preventatives of this. Common diachylon plaster, spread upon thin leather, makes an useful application for fores of this kind.

§ 11. *Of Sprains and Contusions.*

CONTUSIONS of the softer parts of the body, and sprains of the tendons and ligaments of joints, are usually productive of immediate painful inflammatory swellings.

Slight affections of this kind seldom meet with much attention; but when the injury is severe, it often requires the utmost skill of the practitioner, as well as much caution on the part of the patient, to remove those effects which ensue from it, and which otherwise might continue during life.

An increased action in the arteries of an injured part, by which red globules are forced into vessels which naturally do not admit them, will account for all the phenomena which usually attend inflammation: But in the severer degrees of sprains and contusions, along with an increased action of the arteries in the part, which must necessarily result from the pain with which they are accompanied, it is evident that instantaneous effusion likewise takes place, from the rupture of a great number of small vessels. In no other way can we account for those tumors of considerable bulk, which often succeed almost instantaneously to sprains. For the most part the effusion must be of the serous kind, as the skin usually retains its natural colour for some time after the accident: But the tumefied parts are sometimes of a deep red, and on other occasions of a leaden colour, from the first; owing to a rupture of some of the vessels containing red blood.

In

In the treatment of sprains and contusions, two circumstances chiefly require attention. In the first place, we should endeavour to prevent the swelling, as far as this can be done, and afterwards those remedies should be employed which we know to prove most powerful in preventing or removing inflammation.

It is alleged, indeed, by some, that the swelling which occurs from contusions never does harm, and therefore requires no particular attention. In contusions of the cellular substance, or even of the muscles, I allow that this is often the case; for to whatever extent the tumefaction may proceed, the effused fluid is in these parts very commonly absorbed. But even here the swelling in some cases proves extremely obstinate: And in sprains of the tendons and ligaments, a very troublesome, painful thickness of the parts that have been injured, is apt to continue for a great length of time; in some cases, even for life: And I have commonly observed, that this has in general been nearly in propor-

tion to the size of the tumor which occurred at first; for it would appear that effusions thrown out by ligamentous parts are not so readily absorbed as those which occur in other parts of the body. Hence in all these accidents, it is an object of importance to prevent the swelling from arriving at any considerable magnitude.

With this view, we depend chiefly on astringent applications; such as the lees of red wine, ardent spirits of every kind, and vinegar. By immersing a sprained or contused part in any of these immediately on receiving the injury, if the effusion be not altogether prevented, it will at least be rendered much less than otherwise it probably would be. And it often happens that the immediate application of cold proves equally useful. Plunging a sprained limb into the coldest water that can be procured, or even into water rendered artificially colder than natural, is a practice that often proves useful; and it should be always advised in the first place, till one or other of the articles mentioned above  
can



can be procured; for as the effusion takes place quickly, no time should be lost in the application of the remedies.

It fortunately happens, that those applications which prove most effectual in preventing the effusion that ensues from sprains, prove likewise useful in preventing inflammation. But as this symptom is in severe sprains apt to proceed to a great height, other remedies are required in the treatment of it; and none that I have ever employed prove so effectual as local blood-letting. By the time that cold water and other discutients may be supposed to have produced any effect, and which will be in the space of an hour, a number of leeches should be applied over all the tumefied part; or, in contusions of fleshy muscular parts, cupping and scarifying will be found to answer equally well. But in whatever way it is done, a quantity of blood should be drawn off somewhat proportioned to the strength of the patient and violence of the injury.

For a long while past, I have been in the constant practice of employing local blood-letting in sprains and contusions of every kind; and in all of them, whether the injury has been slight or severe, it has proved an useful, pleasant, remedy. In the slighter kind of sprains, one plentiful evacuation of blood by means of leeches, will in general prove sufficient. But when the parts are much injured, we are under the necessity of applying them repeatedly. They should be ordered indeed from time to time as long as any considerable pain remains in the affected parts. Even when the inflammation and swelling of the teguments are gone, a fulness or thickening is often discovered in the tendons and other deep-seated parts; and we conclude, that they continue inflamed, as long as they are much pained either by pressure or motion. In this situation nothing ever proves so effectual as the application of leeches: The remedy indeed seems to prove equally useful, whether the inflammation be seated entirely in the skin, or in the more deep-

deep-seated parts ; so that it should not in any case be omitted.

In violent sprains the pain is often so severe, as to induce quickness of pulse and other symptoms of fever. In such cases, along with local blood-letting, it is sometimes necessary to take blood from some of the larger vessels. Opiates become necessary, together with all the remedies that prove useful in fevers arising from inflammation.

After blood has been freely evacuated from a sprained part, the best application that can be used for some days at first, is a solution of cerussa acetata, and afterwards, for the removal of that thickened state of the ligaments and tendons which often succeeds to sprains, the pouring of warm water upon the part two or three times daily, for the space of a quarter of an hour or so each time, proves often useful. Even common spring water frequently answers the purpose ; but it seems to prove more penetrating when impregnated with sea salt, or crude sal ammoniac : We have likewise reason to think,

that the warm waters of Bath and Buxton are rendered more effectual in cases of this kind, by the impregnations which they contain, than they otherwise would be.

Along with warm bathing, frictions with emollient applications prove sometimes useful in removing this thickening of the parts induced by sprains. But they require to be persisted in for a considerable time.

During the cure of a contusion or sprain, the injured part should be kept as much as possible in an easy posture. In every instance this should be attended to, but more especially when the pain is very severe, an occurrence which probably depends on the fibres of some of the sprained tendons being ruptured, and which nothing will cure so readily as the limb in which it has happened being kept for a considerable time in a relaxed easy posture.

We have already mentioned the warm bath as a remedy in sprains. In various cases cold bathing also proves serviceable.

After

After sprains have been of some duration, the injured part is apt to continue weak and relaxed, even when the pain and swelling are gone. In this situation, cold water being poured upon the part from a height, or being suddenly dashed upon it, and repeated once or twice daily, will prove more effectual in strengthening the weakened limb than perhaps any other remedy. It is for the removal of debility only, however, that cold bathing should be employed; and there is much reason to think that it has done mischief when used in the more early stages of sprains. While much thickening of the tendons and ligaments remains, and which often proves the most formidable, as well as the most obstinate symptom which accompanies sprains, a long continued use of cold bathing seems to do harm, by rendering the thickening more firm than it was before, while the contrary effect often results from a proper application of warm water.

A bandage or roller applied over the injured parts, as tight as the patient can



easily bear it, proves often useful in sprains. By supporting the relaxed parts, it not only prevents pain, but the œdematous swellings also, to which sprained limbs are often liable. The roller should be of flannel, which yields more readily than linen to any variety in the size of the limb, while it serves as the most effectual preventative of those rheumatic affections with which limbs that have suffered much from sprains are liable to be attacked. The roller must be carried spirally upwards from the inferior part of the limb, with an equal pressure on every part of it, in order to prevent œdema, which might otherwise take place.

## S E C T I O N   III.

*Of Chronic or Indolent Tumors.*§ I. *General Remarks.*

**T**HE general character of this class of tumors is, that they are slow in their progress, and not necessarily attended with inflammation. Tumors of every kind may eventually, indeed, induce inflammation: Thus, swellings which have long remained indolent, by an increase of bulk will often distend the skin so much as to become inflamed; and all the varieties of hernia, although not necessarily accompanied with inflammation, for they frequently take place without it, tend often to induce it, for reasons

sions too obvious to require being mentioned. But in these, we consider inflammation as an accidental occurrence only, and in no way connected with the rise or formation of the disease. Of the chronic tumors we shall first consider those that are encysted.

### § 2. *Of Encysted Tumors.*

EVERY tumor might be considered as encysted, the contents of which are surrounded with a bag or cyst, as is the case with every variety of hernia and hydrocele, as well as with some other tumors, but in common practice those tumors only are termed Encysted that are contained in cysts of a preternatural formation. In common language, these, as well as various tumors of the sarcomatous kind, are termed Wens.

The different parts of which an animal body is composed, are connected together by a common medium, termed the  
Cellular

Cellular Substance ; which is so universally diffused, that it seems to form a very considerable part of every fibre. In a state of health the cells of this substance communicate with each other ; and, like the large cavities of the body, they are kept soft and moist by a secretion constantly passing into them by the exhalents, and returning from them by the absorbents. In some parts of the body this secretion would appear to be entirely of a serous nature ; while in others it consists evidently of oil or fat.

While the absorption of this fluid is in proportion to the quantity exhaled, no accumulation takes place : But various causes may concur to destroy the equilibrium ; and in whatever way this may happen, if more is secreted than is carried off by the absorbents, a fulness or swelling must necessarily ensue. Where this superabundance is of the serous kind, a dropical swelling will be produced ; when of an oily nature, obesity or fatness will take place.

A general disposition in the system to this kind of accumulation is a frequent occurrence ; but causes sometimes occur by which collections are produced in particular parts. In a sound state of the cellular substance, that natural communication we have mentioned as subsisting between the different cells of which it is composed, must necessarily prevent any partial or circumscribed collection. And accordingly we know, that all serous effusions very readily pass from one part of this membrane to another. But this communication may be interrupted by inflammation as well as other causes, and accumulation of this natural fluid may therefore take place in a particular part.

We thus account for the formation of encysted tumors ; to which different names have been applied, according to the consistence and appearance of their contents. When of the consistence of honey, the tumor is termed *Meliceris* : When of a soft cheesy consistence, or resembling dough, it is termed an *Atheroma* ; and *Steatoma*, when formed of fat.

But



But it is proper to remark, that various degrees of consistence are observed in each of these. Thus the steatoma is sometimes soft like butter, and at other times firm like suet: And the same kind of variety occurs in the contents of the atheroma and meliceris, which in some cases are equal in firmness to new cheese, and in others not firmer than the thinnest honey.

The matter forming steatomatous tumors, we conclude to be from the first of an oily or fatty nature; and that their different degrees of consistence will depend upon the remora of their contents, and quantity of thinner parts of them that happen to be absorbed. And I think it probable, that atheromatous and melicerous tumors are originally formed by a deposition of serum, with perhaps a considerable proportion of coagulable lymph; and that the degrees of consistence of which we find them, will depend upon various causes: Upon the particular quantity of coagulable lymph contained in them; upon

upon their being of longer or shorter continuance ; and particularly, upon their having been inflamed or not ; and upon the extent to which this inflammation may have proceeded.

For the most part, practitioners accustomed to this branch of business may be able to distinguish with sufficient exactness the nature of these tumors before laying them open. Thus, in general, the steatoma is of a firm consistence : It is commonly loose, and rolls more readily than the others under the skin ; and its surface is apt to be unequal : The atheroma is soft and compressible, but no fluctuation is observed in it : While, in the meliceris, the fluctuation of a fluid or thin matter is in general very distinctly perceived. It is proper, however, to remark, that neither these, nor any other means of distinction, will at all times prove sufficient : For in some cases the steatoma, instead of being firmer than the others, is considerably softer ; insomuch that I have met with different instances of the fat of which they are formed,

formed; fluctuating or moving between the fingers like thin purulent matter; and where accordingly the opinion that was previously formed of it was altogether erroneous. The atheroma and meliceris are sometimes combined in the same tumor: One part of it will be of a soft pultaceous nature, and contained in a separate cyst or cell, while the rest is perhaps of the same consistence with purulent matter. In a few cases too, the steatoma it conjoined with these; but this is not a frequent occurrence.

In judging of the nature of these tumors, some advantage may be derived from attending to their situation. Thus we observe, that in some parts of the body, fat is more apt to be deposited in the cellular substance than in others. In some parts indeed, fat is scarcely ever perceived in it; as is the case over a great part of the head; while in others, particularly over the prominent part of the abdomen, we commonly meet with it even in the leanest subjects. Now I believe

lieve it will be observed, that steatomatous tumours are seldom, if ever met with in those parts of the body which are not usually in a state of health supplied with fat: At least this has been so much the case in the course of my practice, that I have never met with an instance of it; and it tends much to confirm the idea which I have endeavoured to establish of the formation of these tumors. The head, as I have observed, is very sparingly supplied with fat, at the same time that we find it more liable than any part of the body to encysted tumors; but these tumors are very universally of the atheromatous or melicerous kinds\*. Nor have I ever met with the steatomatous tumor but where fat is usually deposited in the contiguous cellular substance.

They

\* By Atheromatous and Melicerous, I mean to express different degrees of consistence of a curdy pultaceous matter. By some, the firmer kinds of this have been mistaken for, and described as the contents of the steatomatous tumor; but they will be found to be in every respect different from the fatty substance contained in the real steatoma.

They are rarely indeed observed on that part of the body which is most plentifully supplied with fat. We seldom meet with these or any other variety of encysted tumor on the abdomen: and at first view this may be considered as an objection to our theory: On farther attention, however, it will rather appear to support it. The parietes of the abdomen being formed of soft yielding parts, with no bone or hard body beneath, we may readily suppose that they will scarcely, if at all, be affected with pressure: So that this cause of obstruction will not here have the same effect as on the head and other parts where the cellular substance lies immediately above the bone.

All the tumors of the encysted kind are small at first, and increase by slow degrees. They are of very different shapes and sizes: In some they resemble a walnut; on the head they are commonly round and smooth, and do not often arrive at any great bulk; but in other parts of the body they are often of an irregular



lar form, at the same time that they are more apt to acquire a greater size. I have met with steatomatous tumors weighing upwards of twenty pounds; and sometimes they are double this weight. They are never at first attended with pain; and the skin for a considerable time retains its natural colour. But when by long duration they become large, the veins of the skin, as well as those of the sac, become large and varicose; and the prominent part of the tumor acquires a clear red colour, similar to that which accompanies inflammation: But it seems to be different from this, as it is seldom attended with pain, unless when injured by external violence. A blow or bruise will readily indeed excite inflammation, by which the skin will become tender and painful, and will crack or burst, if not prevented by the contents of the tumor being discharged by an operation.

This is the ordinary progress of these tumors: But it is proper to remark, that although they never advance quickly, yet

in some situations they terminate much sooner, and arrive at a greater bulk than in others. Thus, in the head they do not usually become bigger than a large egg. In a few cases, indeed, they are larger; but for the most part they terminate before they acquire this size, by the teguments becoming tense and thin, and even bursting if not prevented in the manner we have mentioned. But on other parts of the body, particularly on the back, on the shoulders, and thighs, the teguments sometimes retain their natural appearance long after a tumor has become very large. This seems to proceed from different degrees of laxity in the skin. In the head, the teguments are firm, and do not yield so readily to distention as in other parts of the body; by which any tumors lying beneath them must necessarily be more quickly brought to a period.

The situation of these tumors has likewise a considerable effect on the firmness with which they are attached to the contiguous parts. In some parts they are so

loose and moveable, especially while they continue small, that they readily yield even to slight degrees of pressure: But in others, particularly where covered with any fibres of muscles, they are apt to be firmly fixed from their commencement. The attachment of tumors is also influenced by their remaining more or less free of inflammation; for they never become inflamed, even in the slightest manner, without some degree of adhesion being produced between the cysts and corresponding teguments.

In the treatment of encysted tumors, we are directed by authors to attempt to cure them in the first place by resolution; and if this fails, by extirpation. With a view to accomplish a cure by resolution, frictions with mercurial ointments are recommended, together with gum-plasters, and a variety of other applications. No practitioner, however, of the present age, will depend upon this management; nor will he expect to be able to remove these tumors in any other manner than by the aid of surgery.

We

We shall therefore suppose that the removal of one of them by an operation is agreed upon : The next point to be determined is the mode of effecting it ; and this in a great measure should depend upon the contents of the sac. If they appear to be of the thin melicerous kind, which for the most part will be the case if a distinct fluctuation is perceived through the whole body of the tumor, it ought to be treated like a common abscess. In small collections, the matter may be discharged by laying the most depending part of the tumor open with a common lancet, and treating it in the ordinary way till it fills up or adheres from the bottom : But as in large swellings of this kind, the free admission of air proves always hurtful, the opening should be made in a manner the least likely to be attended with this inconvenience. In a preceding part of this work, I have recommended the passing of a seton or cord through large abscesses as the best method of opening them ; and as the same me-

thod may with equal propriety be employed in encysted tumors formed by collections of thin matter, we shall now refer to what was then said upon the subject \*. I shall at present only observe, that the cord should pass through the whole extent of the tumor, from the superior part of it to the most depending point; and that the inferior opening at which it passes out should be sufficiently large for admitting the matter to be freely discharged. In this manner I have had many instances of large encysted tumors being healed with much more ease than almost ever happens under the ordinary method of treatment. Several years ago, I gave my opinion upon this point at considerable length; and farther experience of the advantages which result from it has tended much to confirm it †.

This method of cure, however, is only applicable where the contents of tumors are so thin as to be easily discharged

\* *Vide* Chap. I.

† *Vide* Treatise on Ulcers, &c. Part I.



ged by a small opening. When too firm to admit of this, they must either be emptied by an extensive opening into the cyst, or the cyst with its contents must be dissected out.

Where a cyst containing matter adheres so firmly to the contiguous parts as to require much time to remove it by dissection, it should never be attempted. It will be sufficient to lay it freely open through its whole extent, and to remove any portions of it that may be loose. The contents of the tumor will in this manner be completely removed: And the cure may either be effected in the usual way, by preserving the wound open till it fills up with granulations from the bottom; or it may be attempted by drawing the divided edges of the skin together, and trusting to moderate pressure and the ordinary effects of inflammation for producing a complete reunion. I have succeeded in both ways; and I think it necessary to observe, that both are equally certain. To those accustomed to think

that it is necessary to remove the cysts of these tumors entirely, it will at first appear to be unsafe to allow any part of them to remain : Many I know are of this opinion, but experience would soon convince them that it may be done with safety : When we resolve, however, on removing the cyst, it is better to open it by a longitudinal cut through the whole tumor than to remove it entire. When the cyst is empty, it is more readily laid hold of with the fingers or forceps, and more easily dissected out, than when the bag remains full and distended.

When the bag is thus removed, the teguments should be laid together and retained with adhesive plasters, or with two or three sutures, as the operator may incline : And if an equal pressure is made over the whole, a cure may thus be obtained by the first intention. In every part of the body this is an object of importance, as it tends to shorten the cure ; but it is particularly proper in the face and other external parts of the body, where

where the cicatrix produced by a tedious sore proves for the most part very unseemly.

The arteries which supply the cysts of these tumors are sometimes so large as to pour out much blood when they are cut. In this case, they should be immediately secured with ligatures: And if the threads are left of such a length as to hang out at the lips of the wound, they prove no obstacle to the cure being completed in the manner we have directed; for when applied with the tenaculum, as they ought to be, they may be drawn away with ease and safety at the end of the second or third dressing. By an ill-timed caution, some practitioners, from an apprehension that ligatures in such circumstances may do harm, have advised that none of the arteries which appear in the removal of these tumors should be tied. Nay, some have gone so far as to say, that it is seldom or never necessary to apply ligatures to such arteries as are cut in the removal of scirrhus breasts: But as I have known  
different

different instances of patients dying suddenly from loss of blood where this precaution was neglected, and as I never met with a single case of any harm being done by attending to it, I would advise every artery to be secured that does not stop immediately on being divided. Besides the real danger to be expected from this being neglected, it is apt to frustrate our intention of healing the sore without the formation of matter.—In the removal of cancerous breasts, where the edges of the divided skin have been drawn together so as to cover the sore, by the bursting of an artery which had not been secured, such a quantity of blood has been effused between the teguments and parts beneath, as has either prevented them from uniting, or has rendered it necessary to remove the bandages, and to lay the parts again open in order to discover the bleeding vessel. Of this I have met with such a number of instances, that I am convinced every practitioner of experience must probably have done the same.

In

In tumors of an ordinary size, there is no necessity for removing any part of the skin. By a single incision along the course of the tumor, in the manner I have directed, the sac will either be laid sufficiently open, or it may be removed with equal ease as if it were opened by a crucial incision; and although the skin may at first appear to be too extensive, yet in the course of a short time it will contract so as merely to cover the parts beneath. But in tumors that are extensive, where the skin is so much distended as to give cause to imagine that it will be much puckered if part of it is not removed, some portion of it should be taken away. This will be best effected by including in two semilunar cuts as much of the skin as ought to be removed; and this being done, the portion of skin thus separated must be taken away along with the cyst. In the same manner, when we are operating upon a tumor where the prominent part of the skin is either ulcerated, or rendered so thin by distention that we cannot with propriety



propriety attempt to save it, such parts of it as are thus affected should be included between two semilunar cuts, and removed in the manner I have mentioned. In other respects, the cure must be conducted as if none of the skin were taken away, by drawing the divided edges of the teguments together, and endeavouring to make them unite by the first intention, in the manner I have advised.

Where tumors of this kind are so large as to render it proper to remove any part of the skin, we are desired by some practitioners to do it with caustic; and by others caustic is used for opening every tumor. Caustic, however, should never be employed where patients have resolution to submit to the use of the scalpel,

### § 3. *Of Ganglions.*

By the term Ganglion, we here mean an indolent moveable tumor which forms upon the tendons in different parts of the  
body,

body, but most frequently on the back part of the hand and joint of the wrist.

These tumors possess a considerable degree of elasticity; by which they may in general be distinguished from the encysted tumors described in the last section. They seldom arrive at any great bulk; they are not often attended with pain; and for the most part the skin retains its natural appearance. On being laid open, they are found to contain a tough, viscid, transparent fluid, resembling the white of an egg.

It seldom happens that ganglinous tumors become so large as to render them the objects of surgery. On their first appearance, they may often be removed entirely, either by moderate friction frequently repeated, or gentle pressure with thin plates of lead properly secured with a bandage. In this manner, they are more readily dissolved than any other kind of swelling: But neither the friction nor the pressure should be carried too far, otherwise the skin may be so much fretted

as

as to give rise to inflammation ; by which suppuration, and abscesses difficult to cure, may be induced.

When this method of removing a ganglion does not succeed, nothing farther should be attempted while the tumor remains of a moderate size : But when it becomes so large as to prove troublesome, either by impeding the motion of a joint, or in any other manner, it ought to be removed by excision, in the same manner as we have advised in the treatment of encysted tumors when the cyst is to be taken away ; that is, by making a longitudinal cut through the teguments over the whole extent of the tumor ; and after separating the skin on each side, to dissect it off from the tendon : Or, when it is found to adhere so firmly to the contiguous parts as to render this impracticable, an incision may be made into it of such a depth as to discharge the contents of it, after which a cure may be effected by preserving the wound open till it fills up with granulations from the bottom.

In

In general, practitioners are averse to operate on these tumors, on the supposition of the wound being difficult to heal; but I have seldom known this to be the case.

§ 4. *Of Swellings of the Bursæ Mucosæ.*

THE bursæ mucosæ are small membranous bags seated upon, or very contiguous to the different large joints. They naturally contain a thin, transparent, gelatinous fluid, which seems to be intended for lubricating the parts upon which the tendons move that pass over the joints. They are met with in other parts of the body, but chiefly about the hip-joint, the knee, ankle, shoulder, elbow, and wrist\*.

In a state of health, the fluid contained in these bursæ or sacs is in such small  
quantity

\* The best account that has yet appeared of the situation and number of the Bursæ Mucosæ, may be seen in a late publication upon this subject by Dr Alexander Monro of this University.

quantity, that it cannot be discovered till they are laid open by dissection: But in some cases it accumulates to such an extent as to produce tumors of considerable bulk. This is not an unfrequent effect of contusions and sprains; and I have often met with it as a consequence of rheumatism. The swelling is seldom attended with much pain: It yields to pressure, but is more elastic than where ordinary matter is contained: At first it is always confined to one part of the joint; but in some cases the quantity of accumulating fluid becomes so considerable as nearly to surround the joint.—The skin always retains its natural appearance, unless attacked with inflammation.

The contents of these tumors are found to be of different kinds, and this seems to depend on the cause by which the swelling is produced; a circumstance which merits particular attention. Thus when the tumor is induced by rheumatism, the contents of the sac are commonly thin and altogether fluid, resembling the synovia  
I of



of the different joints; at least this has been the case in any of those which I have known opened: While in such as proceed from sprains, we usually find, mixed with this transparent fluid, a considerable quantity of small elastic concretions. In a few cases I have met with these concretions of a soft texture, so as to be easily compressed between the fingers; but in general they are too firm to admit of this. We may commonly, however, judge of this, even before the tumor is opened, by the kind of fluctuation that takes place. When the concretions are soft, the fluctuation is usually distinct; but when they are firm, it is not so clearly perceived, and they are easily felt beneath the fingers on being pressed from one part of the sac to another.

In practice it will be found to be an object of importance, our being able to distinguish between those collections which proceed from rheumatism, and such as are the consequences of old sprains: For in the former, I believe, it will be seldom

necessary to propose any operation; as in most instances, perhaps in all, the swelling will at last disappear, merely by keeping the parts warm with flannel; by frequent frictions; by warm water being frequently pumped upon them; or by the application of blisters. At least this has happened in almost every rheumatic case of this kind in which I have been concerned.—But in those swellings of the bursa mucosa, which originate from sprains, although the quantity of effused fluid may remain stationary, or may even lessen in quantity, it will seldom, if ever, disappear entirely. In such cases, therefore, when the tumor arrives at such a size as to prove troublesome, we are under the necessity of proposing an operation for removing it.

The only operation that is admissible, is the opening the sac, so as to discharge the matter contained in it, and to preserve the wound open till it fills up with granulations from the bottom. In most situations this may be done with safety; but.

but in some parts, particularly about the joint of the wrist, these collections are so covered with tendons that the greatest caution is required in every operation of this kind. When the contiguity of tendons prevents the sac from being opened to such an extent as may probably ensure a cure, it will be better to lay it open at each end; and after pressing out the contents, to pass a small seton or cord from one opening to the other. In this manner a slight degree of inflammation will be excited on the inside of the sac, when the cord may be withdrawn, so as to admit of a cure being attempted by gentle pressure, applied with a roller over the course of the tumor. I have sometimes succeeded in this way, when a cure could not be obtained by any other means; and when the cord is cautiously introduced with a blunt probe, no harm occurs from it, even when it passes beneath some of the tendons. The cord, however, should not be continued so long as to induce much pain or inflammation; for in the

neighbourhood of large joints this might prove alarming: And we know from experience, that even a slight degree of inflammation answers the purpose sufficiently.

A good deal of stiffness commonly remains upon that part of the joint where the tumor was situated. The most effectual remedy for this, is frequent frictions with emollients, and a proper application of warm steams to the part affected.

§ 5. *Of Collections within the Capsular Ligaments of Joints.*

COLLECTIONS of various kinds are met with in the capsular ligaments of joints. Blood may be effused within them. Inflammation is here, as in other parts, frequently succeeded by the formation of matter; and serous effusions occur in them, forming what are commonly termed Dropsical Swellings of the joints.

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These swellings should be distinguished with precision from others which they resemble. They are most apt to be confounded with collections in the bursæ mucosæ, or matter effused in the cellular substance covering the joints. From the first of these they may in general be distinguished, by the contained fluid passing with freedom from one side of the joint to the other; and from its being diffused over the whole of it: Whereas, when contained in one of the bursæ, the tumor is more circumscribed; being for the most part fixed above or upon one side of the joint. Collections of matter in the bursæ mucosæ are seldom painful, while every tumor seated within the capsular ligaments of joints is apt to excite violent degrees of pain.

They are more easily distinguished from matter collected in the cellular substance covering the joints. In the last, the collection is evidently superficial; and it is not so much confined to the joint itself, being in general found to extend in every

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direction



direction farther than the boundaries of the capsular ligaments.

We judge of the nature of the fluid collected in these swellings by the circumstances which have preceded them, as well as by the symptoms with which they are accompanied. When a violent bruise of a joint is immediately succeeded by a large effusion within the capsular ligament, it will probably be found to consist chiefly of blood. This is not a frequent occurrence; but as I have now met with it in two instances, I conclude that it may happen in others.

When inflammation of a joint terminates in effusion within the capsular ligament, there will be reason to imagine that the matter forming the tumor is of a thin ferous kind, with some tendency to purulency: For well-conditioned pus is seldom met with in ligamentous or membranous parts. And lastly, when collections within the capsular ligaments succeed to rheumatic affections, there will be much reason to suppose that they are entirely ferous;

ferous; for we know from observation, that effusions which take place in rheumatism are very commonly of this kind.

The importance of our being able to ascertain the kind of matter contained in these swellings, becomes obvious from the difference of practice which they require: As the making an opening into a large joint is always hazardous, from the pain and inflammation which it is apt to excite, it should never be attempted but from necessity. One of the causes, in general, supposed to require it, is matter collected within the capsular ligaments: But when by experience we discover that a particular kind of matter may be allowed to collect in this situation without any detriment, we rather allow it to remain, than incur the risk which might ensue from letting it out. Now this is uniformly the case with those effusions which succeed to rheumatism. Whether collected in the bursæ mucosæ, as mentioned in the preceding article, or within the capsular ligament of a joint, they should never be laid open.

Of whatever size they may be, they will very commonly be discussed by the remedies we have mentioned, namely, by frictions; the pouring of warm water upon the parts affected; proper covering with flannel; and the use of blisters; or, when these fail, supporting the tumefied parts with a laced stocking, or a roller, will often prove successful. But whether we are able to dissipate the swelling entirely or not, when we are convinced that it is of the rheumatic kind, no opening should be made into it. The patient may continue to complain of some uneasiness and stiffness in the joint, but this will be trifling when compared with the pain and inflammation which may occur from laying it open. But when matter is collected in the cavities of joints, which may do mischief by lodging, or which does not readily admit of absorption, an opening should be made for discharging it. The matter which forms in consequence of high degrees of inflammation, and effused blood,

blood, are of this kind. Blood is frequently extravasated among soft parts without much detriment; but when in contact with cartilage or bone, it soon hurts them materially; and the same effect follows from the lodgment of matter formed by inflammation.

The danger accruing from this operation seems to depend in a great measure upon air finding admission to the cavity of the joint, which ought therefore to be as much as possible guarded against. For this purpose the opening should be made with a trocar; and if the skin is previously drawn tight to the upper part of the tumor, by pulling it down immediately on withdrawing the canula after all the fluid is evacuated, the risk of air being admitted will thus be lessened. A piece of adhesive plaster should be directly laid over the opening in the skin; and the whole joint should be firmly supported, either with a laced stocking, or a flannel roller properly applied round it.

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As a farther preventative of bad consequences from this operation, if the patient is plethoric, he should be blooded to such an extent as his strength will bear: He should be put upon a strict antiphlogistic regimen; and in every respect should be managed with caution: For inflammation being very apt to ensue from it, we cannot be too much on our guard against it.

§ 6. *Of Concretions and preternatural Excrescences within the Capsular Ligaments of Joints.*

WE sometimes find joints become painful, and their motion much impeded, by the preternatural formation of substances within the capsular ligaments. In some these bodies are small and loose, and of a firmness equal to that of cartilage; and in others they are of a soft membranous nature, sprouting from an eroded surface of one of the bones forming the joint,  
or



or from the inner surface of the capsular ligament.

In some cases, they remain fixed, or nearly so, without being much affected either by pressure or the motion of the joint: This is particularly the case in those that are soft and membranous, which are in some degree fixed by their attachments. But the others, which have nearly the firmness of cartilage, are commonly so moveable, that their situation is altered by every motion of the limb; and they slip so easily on being touched, that it is difficult to fix them even with the fingers.

In the former, which remain fixed nearly to the same situation, the pain is constant, but seldom severe; whereas in the latter, it is only felt in particular situations, chiefly I suppose when the connecting membrane passes between the ends of the bones: But in these cases it proves often so severe as to be altogether insupportable. I have known different instances of this, where in certain postures  
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of the leg, for it is in the knee in which these concretions seem chiefly to occur, the pain became suddenly so exquisite as to induce fainting. And where this returns frequently, the patient is so much afraid of it, that he inclines rather to avoid walking almost entirely than incur the risk of inducing it. Nay, in some cases, I have known the patient roused from the most profound sleep, by the limb being merely moved when in bed.

As these substances are of a nature that will probably for ever resist the power of medicine, and as they can only be removed by the joint being laid open, the question to be determined is, Whether this ought to be attempted or not? Many speak of this as an operation of so little hazard, that practitioners are apt to advise it in all cases where the pain induced by the disease is severe. In two cases, indeed, which fell under my own management, the joints of the knee were laid open; the foreign bodies were removed; and the wounds healed almost  
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with the same ease, as might have been expected in similar injuries in any other part. But since that period, different instances have occurred where this operation induced the most alarming symptoms; and even terminated in such a manner as to render it necessary to amputate the limb. I never observed indeed such high degrees of inflammation from any other cause; neither is it confined to the joint itself. The whole limb, both above and below the wound, becomes stiff and swelled in a remarkable degree, with painful inflammatory tension, extending from one end of it to the other.

The uncertain success of this operation may make us doubtful in every instance of advising it. The following is the opinion I have formed of it, drawn from a good deal of experience in cases of this kind. Where concretions formed within the capsular ligaments of joints, appear, upon examination with the fingers, to be loose and detached, if the pain which they excite is severe, rather than submit  
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to this, we should venture in a cautious manner to take them out, by making an incision into the joint : But wherever there is reason to suspect that the concretions are connected with any part of the joint, the patient should rather be advised to submit to the pain which they induce, and which in general will be rendered moderate by avoiding exercise, than to run the risk attending this operation.

The pain indeed, even in a retired life, may become insupportable. In this case I would advise the amputation of the limb. The remedy is no doubt severe ; but it is less painful, as well as less hazardous, than the excision of any of those concretions when attached to the capsular ligaments.

The opening into the capsular ligament for the removal of these loose bodies, may be made in the following manner : If in the joint of the knee or ankle, the patient should be laid upon a table or on a bed ; but if any of the joints of the arm are to be opened, he may be allowed

to fit ; only, in whatever posture he may be, the limb should be secured in the firmest manner by assistants, in that posture which admits of the body to be taken out being felt in the most distinct manner. On this being done, the surgeon should endeavour to fix it with his left hand towards the upper part of the joint, after an assistant has been desired to draw the skin as much as possible upwards from the part where the incision is intended to be made. The surgeon, with a scalpel in his right hand, is now to make an incision through the teguments and capsular ligament, directly upon the substance itself, of such a size as will admit of its being easily taken out ; which will be easiest done by the end of a blunt probe being passed beneath it. If it is found to be connected by small filaments, either to the capsular ligament or cartilages of the joint, they should be cautiously divided, either with a probe-pointed bistoury or scissors, after drawing the substance itself as far out as it can be got, with small forceps,



ceps, or with a sharp hook when of a texture that admits of a hook being pushed into it. When there are more concretions than one, they should all be taken out at the same opening when this can be done : But when they lie on opposite sides of the joint, two openings will be necessary ; only in this case it will be better to allow the first incision to heal before attempting the second, so as to avoid as much as possible the risk of exciting inflammation.

After the concretions are removed, the skin should be immediately drawn over the wound in the capsular ligament ; and the lips of the opening in the skin being laid together, they should be secured in this situation by pieces of adhesive plaster, so as to prevent the air from finding access to the cavity of the joint. Till the wound is completely healed, the patient should not only be confined to bed, but the limb should be kept as much as possible in one posture ; and a strict antiphlogistic regimen should be observed.

But for the farther management of such cases, and of the symptoms with which they are apt to be attended, we must refer to Chap. III. Section VIII. when treating of Wounds in the Ligaments.

I have mentioned, that the incision into the capsular ligament, should be made at the upper part of the joint. The intention of this is to prevent the synovia, after the skin is drawn over the opening in the ligament, from finding such ready access as it otherwise would do to lodge in the cellular membrane immediately beneath the skin; a precaution that is easily observed, and from which some advantage may be derived.

### § 7. *Of Anasarca or Oedema.*

THE terms *Anasarca* and *Oedema* are applied to that variety of dropfical swelling where the water is collected, not in any distinct cavity, but in the cellular substance. The part is generally cold, and

of a pale colour ; and being possessed of little or no elasticity, it retains the mark of the finger when pressed upon.

Swellings of this kind are for the most part connected with some general affection of the system ; but in some cases they occur in particular parts, from causes which affect these parts only. Thus, legs or arms which have been much weakened by contusions or sprains are apt to become œdematous. Tumors pressing upon any of the larger lymphatics are apt to induce them. And they sometimes occur from the lymphatics of a limb being cut, either by accident or in surgical operations.

In the treatment of these swellings, the circumstance of their being general or local requires particular attention. When induced by tumors pressing upon the lymphatics, the removal of these tumors alone will accomplish a cure: And when they occur as the effect of weakness from sprains or contusions, the best method of cure is to support the weakened parts either with a  
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laced stocking or a flannel roller, to prevent their yielding to distention, till in course of time, and by the effects of cold bathing and moderate frictions, they recover their natural tone.

But in those anasarcaous swellings of the feet and legs which take place as a symptom of general dropsy, we must not venture upon removing or preventing them by compression; for if the serum is prevented from falling down to the legs, it will be apt to fix upon parts of more importance. In these cases, we trust to the general tendency in the system being removed by medicines, for a complete cure: But when the swelling is considerable, we have it in our power to procure temporary relief, by making small punctures through the skin into the cellular membrane, in the most prominent part of it. The relief which this procures is commonly considerable, and it ought to be advised more early in the disease than is commonly done; for besides the present ease which it affords, it prevents that loss

of tone which the cellular substance suffers when anasarcaous swellings are permitted to go to such a height as they often do.

Instead of punctures, incisions are usually employed ; but small punctures made with the point of a lancet answer better : They give a sufficient vent to the water, at the same time that they are not so apt to inflame and mortify. But as we shall have occasion to speak of this when treating of the Anasarcaous Hydrocele in Chap. X. Section II. we shall now refer to that part of our subject.

Where the swelling is induced by any of the lymphatic vessels of a limb being cut, as sometimes happens in extirpating indurated glands from the arm-pit, small punctures made in the under part of the limb afford immediate relief ; while little advantage is derived from blisters or any other remedy.



§ 8. *Of the Spina Bifida.*

THE term *Spina Bifida* is applied to those soft swellings which sometimes appear in the course of the spine in new-born children, most frequently at the inferior part of it, between the two last vertebræ of the loins. A fluctuation is distinctly perceived in them: And the fluid which they contain can in some measure be pressed in at an opening which takes place between the spinous processes of the two vertebræ on which they are seated. In some cases this opening is found on dissection to proceed from a natural deficiency of bone; in others, from the spinous processes of the vertebræ being merely separated from each other: In all of them, the tumor is produced by serum collected within the natural coverings of the spinal marrow. In a few cases this disease is connected with hydrocephalus; but this is not common. For the most part it is a local affection.

This is perhaps one of the most fatal diseases to which infancy is liable ; for as yet no remedy has been discovered for it. In some cases, however, children labouring under it have lived for two or three years ; but in general they linger and die in the space of a few months. All the assistance that art has hitherto been able to afford, is to support the tumor by gentle pressure with a proper bandage. In this manner it has for some time been prevented from increasing, by which life has been protracted ; but this is all that we have yet been able to do.

It has sometimes happened, where the nature of these tumors has not been understood, that they have been laid open with a view to discharge the fluid contained in them. Experience shows, however, that every attempt of this kind should be avoided ; for hitherto the practice has uniformly proved unsuccessful. The patient has either died suddenly, or in the course of a few hours after the operation,

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If conjecture may at any time be indulged, and proposals for innovation mentioned, it must surely be allowable in cases hopeless as the one we are now considering. If the swelling in the spina bifida is produced by real disease subsisting in the vessels of the spinal marrow, or in those of its membranes, it is not probable that any remedy will remove it: But if the opening between the spinous processes of the vertebræ with which it is always accompanied, be not the *effect* of the disease, as is commonly imagined, and if the want of support, which this deficiency of bone must create to the membranes of the spinal marrow, be the *cause* of serous effusions within these membranes, might not some advantage be derived from applying a ligature round the base of the tumor, not merely with a view to remove it, but also to draw the bottom of the cyst so closely together, that it may act as a proper support to the parts beneath? Whether any benefit may be derived from it or not, is no doubt very uncer-

tain: But in a disease which we know will otherwise terminate fatally, we are warranted in proposing whatever can afford even the smallest chance of safety; so that I mean to attempt it in the first case of this kind that falls under my care. After applying a ligature as closely as possible to the base of the tumor, and as soon as the tumor itself has fallen off, I would propose to apply a firm-stuffed pad, similar to that of a rupture-truss, to the opening between the vertebræ; and by means of a proper bandage, to secure it with such a degree of tightness as may serve to support the parts within.

Whether or not this method may in any instance accomplish a cure, is very uncertain; but it appears to be the most probable way of prolonging life: For wherever the tumor has been opened, death seems to have ensued more from the removal of support from the contained parts than from any other cause. Now, no method of treatment we could  
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advise would so readily compress the parts within, and at the same time remove the tumor.

The tumor termed *Spina Bifida* occurs, as we have already observed, in different parts of the spine ; but a swelling of perhaps the same nature is sometimes met with on different parts of the head. A tumor is observed at birth ; and on examination it is found to be formed by a fluid lodged beneath the membranes of the brain, which have been forced out at some unossified part of the skull. In some cases the swelling remains stationary for a great length of time ; but for the most part it becomes quickly larger, and at last terminates in death. Hitherto the same effect has resulted from laying this kind of tumor open, as we have mentioned in *spina bifida*.—The patient has commonly died in a few hours after the operation.



§ 9. *Of Scrophulous Tumors.*

THE point first to be determined in the surgical treatment of scrophulous tumors is, Whether or not we should endeavour to forward their maturation, by means of poultices and other external applications? For a considerable time, I adopted this practice in the freest manner, and applied warm poultices and fomentations to every tumor of this kind, till I was at last convinced by experience of its inefficacy. Nay, I now think, that it does harm: For scrophulous tumors being formed of matter not convertible into pus, poultices and other warm applications have little effect in bringing them forward; and when long used, they weaken and relax the parts so much, that the sores which ensue are more difficult of cure than when poultices are not employed. In all scrophulous sores, the parts are apt to remain long soft and spongy, by which they are prevented from healing. Their effect

effect of these emollient applications, is to increase this tendency to softness to a degree which often proves prejudicial.

As I know of no application which in the real scrophulous tumor ever proves useful, either in retarding its progress or in bringing it forward, I now advise even every covering to be laid aside, unless the patient wishes to prevent the swelling from being seen; in which case he is desired to cover it in the manner that is most agreeable to himself. But as I do not observe that exposure to the air does harm, and as in some cases I have thought that this exposure of the tumor renders the subsequent sores more easily cured, I would prefer this mode of treatment whenever it can be adopted. Even the external application of hemlock, which in the form of poultices is often advised in scrophulous tumors as a discutient, should be laid aside. In scrophulous sores, I have observed some advantage derived both from the internal exhibition and outward application of hemlock: But although I have often  
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known it used in tumors of this kind, I cannot say that any advantage ever accrued from it. The only remedy I have ever known to act with any apparent efficacy in the discussion of scrophulous tumors, is a long continued use of the cold bath, and mineral waters, especially those of Moffat: But in order to produce any effect, they should be entered upon early in the disease, while the tumors are small, and long persisted in. As soon indeed as a patient is attacked with scrophula, I would advise him to enter upon the use of these remedies, and to persevere for several years in applying them. In what manner the drinking of mineral waters, and of sea-water, operates in preventing the formation of tumors in scrophulous patients, will be difficult to determine: But it seems to be probable, that cold bathing, particularly in salt water, proves chiefly useful by invigorating the system at large, and particularly the lymphatic system, which in scrophula appears to be remarkably weak and relaxed.

Of late a new tonic remedy has come into notice, Muriated Barytes, and it seems to act with advantage in the discussion of scrophulous tumors. I am at present using it in upwards of twenty cases of scrophula, but as yet I cannot positively say to what degree of credit it is entitled. It excites appetite; strengthens the constitution; and in some instances both scrophulous tumors and sores, which previously resisted all other remedies, have disappeared while patients were using it. This medicine was first recommended by the ingenious Dr Crawford of London. It is prepared by dissolving aerated barytes in the muriatic acid; evaporating the solution, and dissolving the crystals in water. Of the saturated solution six or seven drops are given at first to an adult, repeated three times a-day, and the dose gradually increased to thirty or forty drops, till it excites sickness or nausea, by adding two drops or so every second or third day to each.

The next point of importance in the treatment of scrophulous tumors, is, Whether

ther they should be opened, or allowed to burst of themselves? This should, in a great measure, be determined by their situation. When seated upon any of the large joints, or on the cavities of the thorax or abdomen, the matter should be discharged as soon as it is discovered, by a free opening with a lancet or scalpel; or in large collections, where it would prove hurtful to expose the cavity of an extensive abscess to the air, it may be done with more safety with a trocar, or with a seton. But where scrophulous tumors are so situated that no harm can arise from the matter being allowed to remain, it is better that they should break of themselves: For even when managed in the most judicious manner, the sores which ensue prove often tedious and difficult of cure, while an unseemly scar takes place, whether the tumor has been opened or not; and the patient and his friends, from ignorance of the nature of the disease, as well as from other motives, are apt to blame any opening that is made, as the  
cause



cause either of a tedious cure, or of disagreeable marks. As an additional reason for this practice, I believe it will be found, that sores ensuing from scrophulous tumors will for the most part heal more kindly when allowed to burst than when opened in any way whatever.

I have only to observe farther, that tumors of a scrophulous nature are occasionally met with, which from inadvertency are sometimes mistaken for those of a real schirrous kind. I also believe that mistakes of this kind have tended to raise the reputation of medicines, particularly of cicuta, and that they have been the cause of tumors being extirpated, which ought not to have been touched. When scrophulous tumors are deeply seated, they have commonly a degree of firmness which they do not possess in the more external parts; and when in a suspicious situation, as in the glandular part of a woman's breast, they are apt to be mistaken on a slight examination for swellings of the schirrous kind. These mistakes, however, may always  
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with ordinary attention be avoided. Even the firmest kind of scrophulous tumors are soft and compressible when compared with schirrus. They are of an equal, smooth surface; they are seldom in their early stages attended with pain; and for the most part similar affections appear in other parts of the body; whereas the real schirrous tumor is always somewhat unequal or knotty, and although it does not for a considerable time become uniformly painful, a stinging disagreeable pain is commonly felt in it from time to time, even from its first appearance; and it is not necessarily connected with symptoms of scrophula.

§ IC. *On White Swellings of the Joints.*

FEW diseases prove either of worse consequences to patients, or are less understood by practitioners, than white swellings of the joints: Insomuch that, when completely formed, the disease may in all  
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most every instance be considered as incurable.

White swelling may be defined a painful enlargement of a joint, not attended with external inflammation; but there are evidently two varieties of the disease, which it is of much importance to distinguish: The one connected with rheumatism, and the other with scrophula. I shall first describe the symptoms and appearances of each, and afterwards the method of treatment which hitherto has proved most successful.

The rheumatic white swelling begins with acute pain over the whole diseased joint and contiguous parts; and the pain is always increased by pressure or motion. As a relaxed posture gives relief, the limb is kept constantly bent, by which the flexor tendons become so stiff and immovable, that from this cause alone the motion of the limb is often irretrievably lost.

If the disease is not soon carried off, the swelling, which at first is always inconsiderable, begins gradually to aug-

ment, and goes on till it sometimes increases to twice the natural size of the part.

The cuticular veins become turgid and varicose; the limb below the swelling decays considerably in its muscular substance, while it frequently acquires an equal or greater bulk by becoming œdematous: The pain turns more intolerable, especially when the patient is warm in bed, or is otherwise heated; and abscesses form in different parts of the swelling, and run in various directions and at different depths.

In all these abscesses, the fluctuation of a fluid is generally evident; but besides this they are springy or elastic; yielding to pressure, at the same time that they do not, like œdematous swellings, retain the mark, but instantly rise again as soon as the pressure is removed.

These different collections, either upon breaking of themselves, or on being laid open, discharge considerable quantities of a purulent like matter. This, however, soon degenerates into a thin, ill-digested  
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fanies ; and has never, at least in proportion to the quantity discharged, any influence in reducing the size of the swelling, which still remains nearly as large as before.

If the orifices from whence this matter flows are not kept open, they soon heal up ; and new collections forming in different parts, again break out and heal as before : So that, in course of time, the whole surrounding teguments are found covered with cicatrices that remain after these ulcers.

Long before the disease has arrived at this state, the patient's health has suffered considerably : first, from the violence of the pain, which is often so great, as to destroy entirely both sleep and appetite ; and then, from the absorption of matter which takes place in some degree from the time of its first formation ; but which does not indeed appear so evidently, till the abscesses in which it is contained are either laid open by incision, or burst of themselves. When this takes place, the



pulse becomes quick, accompanied with nocturnal sweats and a coliquitive diarrhœa, by which the patient is at last carried off, if the member is not soon amputated.

These are the usual symptoms of the rheumatic white swelling; but before proceeding farther, I think it right to describe the appearances which the parts exhibit on dissection, and which I am enabled to do, from many opportunities of being acquainted with them having fallen within my observation.

When the limb is amputated early, the only preternatural appearance that we meet with on laying the parts open, is a morbid thickness of the surrounding ligaments, accompanied with a contracted state of the flexor muscles of the limb, but without any disease of the joint itself. The bones and cartilages remain sound, and the synovia in a natural condition, both in quantity and consistence.

This thickening of the ligaments is in general in proportion to the duration of  
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the complaint. This, however, is not always the case; for I have met with some recent instances, in which the ligaments were more diseased, than in others where the disease had continued longer. In this case indeed the previous symptoms had been always violent.

In the more advanced stages of the disease, when abscesses have formed in different parts; when the pain has been long violent, and the swelling considerable, on laying the parts open, the thickening of the ligaments is still more remarkable, and is generally attended with an effusion into the surrounding cellular substance, of a thick glairy matter, which appears to be the cause of that elasticity peculiar to such swellings, formerly taken notice of in the description.

The different abscesses or collections of matter are found to run in various directions through this glairy albuminous congestion, without, however, seeming to mix with it. In some few instances, again, together with collections of pus, we meet

with a number of small hydatides ; and in the farther progress of the disease, all these together form such a confused mass of different matters and substances, that it is almost impossible, by dissection, to procure a distinct view of them.

Even all these appearances I have met with, without any affection of the bones of the joint ; which, together with the surrounding cartilages, upon cutting through the capsular ligaments, have remained perfectly sound.

When, however, by a long continuance of the disease, these ligaments are eroded by the matter resting upon them, both the cartilages and bones are soon brought to suffer ; the latter becoming carious, as soon as the former, by the acrimony of the matter, have been abraded.

The tendons of the flexor muscles do not, upon dissection, exhibit any morbid appearances, either with respect to hardness or enlargement, but the muscles from whence they proceed are always hard and contracted.

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We shall now, as was proposed, give a description of the scrophulous white swelling.

In this variety of the disease, the pain is generally more acute than in the other; and, instead of being diffused, it is more confined to a particular spot, most frequently to the middle of the joint. In some instances I have known the patients say, even in advanced stages of the disease, that they could cover the whole pained part with a crown-piece, or less.

The swelling is always at first inconsiderable; insomuch that, in some cases, it requires attention to discover the difference between the diseased joint and opposite sound one. We always find, however, on measurement, that it exceeds the other from half an inch to an inch in circumference.

In this, as in the rheumatic white swelling, the least degree of motion always excites pain; the joint is therefore always kept in a bent position, by which the flexor muscles and tendons become stiff and contracted.

On the swelling continuing to advance, the pain becomes more violent, and the swelling more considerable, accompanied with an evident enlargement of the ends of the bones forming the joint.

In process of time, the whole circumference of the tumor becomes elastic; varicose veins appear over its surface; and collections of matter occur in different parts of it: These, upon bursting, or on being laid open, discharge large quantities of thin ill-digested matter; and if a probe is introduced, and passed to the bottom of the fores, the bones are found carious, and pieces of them are afterwards discharged at the openings.

On the farther continuance of the disease, the constitution becomes injured; and the patient is at last carried off by diarrhœa and profuse night-sweats, symptoms which commonly indicate extreme degrees of weakness.

When joints affected in this manner are dissected, either after death, or after amputation of the member in the first stages



ges of the disease, the soft parts seem not to be much injured, but in all, even the slightest that I have seen, the whole ends of the bones, or their epiphyses, are enlarged. In some this enlargement of the bones is confined to one side of the joint, but in others it appears equally in both: In some, this occurs without any other mark of disease, but in general the soft spongy parts of these bones are dissolved into a thin fetid matter, in some cases even without the cartilages which surround them being affected: This I have in different instances seen, although the cartilages for the most part are also found dissolved at last. The same thickening of the ligaments, and effusion of viscid glairy matter is met with here that occurs in the other variety of the disease.

The most frequent cause of white swelling is a previous disposition to rheumatism or scrophula; for although often induced by external violence, particularly by sprains and bruises, the disease seldom  
proves

proves obstinate where the rheumatic or scrophulous diathesis does not evidently prevail.

Hence white swellings of the rheumatic kind are most frequent at that period of life, and in those constitutions in which rheumatism occurs in the most obvious form of the disease: We daily meet with it in the young and plethoric, and not often in patients advanced in years, and of opposite temperaments: We also find, that it is frequently induced by cold, which may be considered as the most common cause of rheumatism, and it attacks chiefly those parts which we know to be the most frequent seat of rheumatic affections: Rheumatism for the most part attacks the large joints only, and it fixes chiefly on the ligaments: Now, we meet with ten instances of this variety of white swelling in the knee for one in any other joint, and we find on dissection, that in the first stages of the disease the ligaments only are affected, as in most instances is also the case in rheumatism: The effusion into the cellular substance of that glairy matter

matter mentioned in the description is probably occasioned by an exsudation from the vessels of those ligaments that have been at first inflamed; for we know that ligamentous parts never furnish a fluid proper for the formation of pus: In the course of the disease, indeed, abscesses containing purulent matter frequently form, but never till the inflammation has spread to the surrounding parts, which more readily afford a fluid fit for this purpose.

In like manner, although the other variety of white swelling commonly begins in the bones, scarcely a doubt can arise of its being of a scrophulous nature: It appears indeed to be the real *spina ventosa* of authors\*, which there is much reason to think is a disease of the same nature in the bones, that scrophula, in its usual form, is in the soft parts: The appearances of the two diseases are exceedingly similar: They both begin with considerable enlargement or swelling of the parts which they attack, and this in both generally

\**Vide* § 16. of this Section.

rally ends in ulceration, and they both often occur in the same person at the same time: This variety of white swelling is most frequent in early life, a period in which other symptoms of scrophula are also most frequent; and if other symptoms of scrophula do not subsist at the time, we commonly find that they have prevailed at some former period, or that the patient is descended from scrophulous parents, and therefore that the seeds of the disease are probably lurking in his constitution.

In the management of white swelling, it is a point of importance, as I have already observed, to distinguish with accuracy between the two varieties of the disease; for in the one, *viz.* the rheumatic, when not of long duration, we may frequently accomplish a cure; while, in the other, no material advantage is to be looked for from any remedy with which we are as yet acquainted: By not discriminating between the two varieties of white swelling, remedies are often employed,

ployed, which, however beneficial they might prove in the one disease, in the other can be of no avail, and may even do harm; and the same want of discrimination is apt to make us despair in every instance, from finding, that in a great proportion of cases no advantage is obtained from any measures we can employ.

In the rheumatic white swelling, we derive considerable advantage from due attention to an antiphlogistic course.

The first remedy which, with this view, should be employed, is blood-letting; but instead of general evacuations from the arm or elsewhere, it proves always more effectual to take blood from the part affected. Cupping and scarifying proves particularly useful. The instrument should be applied to each side of the diseased joint; on each side of the rotula, for instance, when the knee is the part affected: Eight or ten ounces of blood should be discharged, and this should be repeated at proper intervals, once, twice, or oftener, according to the violence of the symptoms,



toms, and strength of the patient at the time.

In the ordinary way of discharging only an ounce or two of blood by this operation, it has, in general, little or no influence; but in the quantities which I have mentioned, and which, by those accustomed to the practice, are commonly easily obtained, it seldom fails of giving relief.

It must be observed, that cupping proves here more beneficial than the application of leeches; which is not only a more tedious method of procuring the same quantity of blood, but the swelling which they occasion is frequently troublesome; and what is often of more importance, it frequently gives an interruption, for a time, to the use of other remedies. In some instances, however, when the swelling of the joint is considerable, it proves difficult, or even impracticable, to procure a sufficient quantity of blood by cupping: In such cases, we are under the necessity of applying leeches, which seldom  
fail

fail of obtaining as much blood as is required.

Upon the anterior part of the joint, where the cupping-glasses or leeches have not been placed, a small blister should be directly applied; and the part should be kept open with issue-ointment, till the wounds from whence the blood was discharged are so far healed, that a blister may likewise be laid on one side of the joint; and as soon as this is nearly healed, the other side should be also blistered.

By thus alternately applying them, first to one side, and then to the other, almost a constant stimulus is excited on the surface; which, in deep-seated inflammation, seems in many instances to have even a more powerful influence than all the discharge occasioned by blisters.

Gentle laxatives, given at proper intervals, prove also serviceable; and the patient should, in every respect, be kept upon a strict antiphlogistic regimen: No animal food should be allowed, nor  
should

should he be permitted to take drink stronger than gruel or whey.

In the first stages of the disease, this mode of treatment seldom fails to prove useful: Local blood-letting, when carried to a sufficient length, very commonly relieves the symptoms induced by inflammation, and the blisters often remove them entirely: These remedies, however, are not to be trusted in the more advanced stages of white swelling, nor ought they ever to be long persisted in when they do not soon procure relief. In this state of the disease we depend upon other remedies.

Mercury proves here particularly useful, not given so as to salivate, but merely to affect the mouth gently, and to keep it somewhat sore for a few weeks.

In such circumstances the best form of using mercury is by external friction; and the unction should be of such a strength as to admit of being used in the quantity of two drams three times a-day; for friction, in order to prove useful, must  
be

be frequently repeated and continued for the space of an hour at each application.

Gentle mercurials may also be given internally, but, as all the advantages to be derived from them, are obtained from unction, together with any benefit that may ensue from the friction used in applying it, the latter should in general be preferred.

By Le Dran, and other French writers, the pouring of warm water on swellings in this situation is much recommended; and I have found in the course of much experience in this branch of business, that more advantage is derived from it than from any other remedy; particularly from the application of warm steam: This remedy, however, in order to prove useful requires to be applied to the parts particularly affected, and to be frequently renewed.

When warm water proves useful here, it may not only act from the degree of

heat which it contains, but in proportion to the height from which it falls: Hence, in some cases, I have desired it to be poured from the height of fifteen or sixteen feet, and in different instances with advantage. It is easily done by pouring the water through a leather or tin tube.

The application of steam and the fall of warm water, proves particularly useful in the removal of that contracted state of the flexor muscles, which very universally takes place in white swellings of the joints. The stiffness of joints affected in this manner, is often in such a degree as to give cause to think that it can only be produced by the ends of the bones forming the joint having run into one another, or by the synovial fluid of the joint becoming thick, and totally unfit for lubricating the parts to which it is applied: I believe, however, that these occurrences are both exceedingly rare: Of all the diseased joints I have dissected, and the number



is considerable, I have only met with two instances of the different bones of a joint adhering to each other, and not one instance of the synovia being inspissated: Neither have I met with any anatomist who ever observed it: I therefore conclude, that the stiffness of joints which succeeds to white swelling proceeds in almost every instance from the cause I have mentioned, a morbid contraction of the flexor muscles of the diseased limb.

I have already observed, that in the removal of this contracted state of the muscles, the application of warm steam, and the fall of warm water from a height, proves particularly useful: We also derive much advantage from the use of emollients: By long perseverance in rubbing contractions of this kind with greasy emollients, I have in many instances proved successful where the patient, after being lame for years, had despaired of ever getting better. Emollients, however, in order to prove useful, must be applied for a great length of time. They must be rubbed

for the space of an hour three times a-day over all the diseased parts. The friction should not be confined, as is commonly done, to the rigid tendons, but should be extended over the whole corresponding muscles from one extremity to the other, and more especially over the fleshy parts of the muscles, where the principal cause of such complaints is probably seated; these parts being chiefly, if not altogether, possessed of the contractile, and consequently of the resisting, powers.

The affection we are now considering, is so obviously one of those requiring the use of emollients, that almost every old woman has some particular form or other of recommending them; one of which I cannot avoid mentioning, as I have frequently known it used, and, in some instances, with very evident advantages, *viz.* the web or omentum of a new-killed sheep, or of any other animal, applied over all the diseased parts directly on being cut out of the animal.

In

In two of the cases to which I allude, one was in the knee, and the other in the hand; and the motion of the joints, after having been totally lost, was almost perfectly restored. The application should be frequently renewed, once a-day at least, or oftener when it can be done: for on being more than four or five hours applied, it becomes disagreeable; after this indeed it commonly turns stiff, and cannot therefore be of much utility. The same kind of remedy, used in somewhat a different manner, I find recommended by LIEUTAUD, a celebrated French practitioner\*.

I have entered more particularly into the consideration of this subject, from having often found, that, with due attention, the use of many joints might be re-

S 3 covered,

\* Mr Lieutaud says, when speaking of such affections, "*Obvolvitur etiam pars affecta pelle calida vervecis, vituli, alteriusve pecudis, recens mactati, vel immittitur in anum ventrem bovis, vitali calore haud defraudatæ.*" *Synopsis Universæ Praxeos Medicæ*, vol. I. p. 400.

covered, which, from a mistaken opinion of their causes, have generally from the first been considered as incurable: And I must here also refer to some farther observations which I shall find necessary to make upon the same subject, in Chapter XLIII. when speaking of distorted limbs.

Hitherto I have supposed the disease not to be so far advanced as to have occasioned the formation of matter; for, when come this length, no material advantages can be expected from any of the remedies we have recommended: but, even in this state of white swelling, if the patient's health is not greatly impaired, amputation of the member should by no means be advised, as is usually done. For, by opening the different abscesses soon after their formation, the matter may be prevented from affecting, or essentially injuring, the capsular ligaments of the joints; the destruction of which would no doubt render it necessary immediately to remove the limb.

All

All collections of this kind should be discharged by passing a seton through them. This never proves hurtful, and by preventing the access of air, as I have elsewhere endeavoured to show, abscesses opened in this manner heal more readily, than they usually do when laid open with large incisions.

By opening the different abscesses as quickly as matter is found to be formed in them, and supporting the patient with a light nourishing diet, while all the other circumstances of his situation meet with due attention, we often succeed in saving limbs which otherwise it would be necessary to remove. At the same time, it must be acknowledged, that instances often occur, in which none of our remedies proved successful, and in which we have no other method of saving life. In such circumstances, we have no room to deliberate, and amputation of the diseased limb ought no doubt to take place.

In Chapter XLV. I shall find it necessary to consider this subject more particularly,



larly, but at present I may observe, with respect to the most proper period of amputating limbs in white swelling, that, even in point of success from the operation, it ought never to be advised till the disease is far advanced. For though it might, *a priori*, be imagined, that the more early in the disease, amputation of the member is performed, the more successful it should prove; and although this, indeed, has been made use of as a common argument for amputating early in every case of white swelling; yet, however plausible the observation may appear, it will not, from experience, be found to hold good. For, in this, as well as in other diseases, I have constantly found, that amputation has more frequently succeeded, that is, a greater proportion of patients have recovered who have previously been considerably reduced, than of such as have still remained in a full habit of body.

In the former, when the constitution has not been too much broken, and we have it  
always

always in our power to guard against its being so, the several symptoms of hectic fever, which previously took place, are commonly removed in a few days after the limb is taken off: No high degree of inflammation is ever produced; the patient daily improves in health; and a complete cure, if he has not been too much reduced, is generally soon obtained. In the latter again, the very reverse of this takes place: The patient, from being in high health at the time of the operation, is generally thrown into a smart inflammatory fever; which is, no doubt, often removed, but which frequently either carries him off immediately, or produces such effects as he never thoroughly recovers from.

So that in no case whatever is it proper to advise amputation till every probable means for saving the limb has been tried in vain.

All the means we have hitherto recommended, relate particularly to the rheumatic species of white swelling; and when employed

employed in time, and duly persisted in, they frequently prove useful: But when the disease is so far advanced as to have destroyed the capsular ligaments of the joint, and perhaps even the cartilages and bones themselves, amputation of the member is then no doubt our only resource.

In the more fatal species of white swelling, namely, the scrophulous, as I know no certain remedy for scrophula, even in its milder form in the soft parts of the body, I cannot here pretend to offer any thing satisfactory upon the subject.

In the small joints, when the diseased parts of the bone begin to cast off, a cure may be sometimes promoted by assisting the efforts of nature; but in all the large joints, particularly in the knee and ankle, it is not probable that any other resource than amputation will ever afford relief. In this variety of the disease, indeed, many are of opinion, that amputation should never be advised; for the swelling being connected with scrophula in the constitution, the disease they conclude will appear

pear in some other part: This in some instances will no doubt happen, but I know from experience, that in a great proportion of cases it will not; and, were the risk of this even much greater than it is, still I would advise it, in preference to the constant torment with which patients in this situation are universally distressed.

When, however, amputation of the member is not to take place, we endeavour by other means to alleviate as much as possible the painful feelings of the patient: With this view, *cicuta* and *hyocyamus* are sometimes given, both separately and combined; but in great degrees of pain we depend upon opiates alone.

### § II. *Of Bronchocele.*

EVERY tumor of an indolent nature occupying the fore-part of the neck, is in common practice termed a *Bronchocele*. In the English language we have no precise

cise denomination for it. In French this disease is termed *Goitre*.

Swellings in this situation would with more propriety be termed *Tracheacele*: But with a view to prevent confusion, we think it better to retain that appellation under which they have commonly been described.

Authors mention different diseases under this denomination: Some contend, that the term *Bronchocele* should be confined to one variety of tumor; and others, that it may be applied to swellings of very different kinds: Disputes of this nature, however, answer no good purpose; and as practical observations are the chief objects of this work, I think it better to mention the varieties of the disease, which I have either seen, or which have been accurately described by authors, with the treatment suited to each, than to enter the lists of controversy upon this part of the subject.



1. The fore-part of the neck, like every part of the body supplied with large arteries, is liable to swellings of the aneurifinal kind. Aneurifms do not frequently occur in this situation, but in some instances they are met with.

This variety of the disease may be distinguished by all the ordinary symptoms of aneurism: By appearing suddenly after some violent exertion; particularly in coughing or laughing; being soft and compressible from the first; by the tumor being at first seated directly on the course of one of the carotid arteries; by the pulse in the advanced stages of the disease being affected, and remarkably unequal, and a strong pulsation being discovered through the whole extent of the tumor.

2. Encysted tumors, particularly those of the melicerous kind, are frequently met with on the course of the trachea.—They are characterised by the same symptoms in this situation by which they are marked in other parts of the body: They are soft and compressible; the fluctuation of

a fluid is evident upon pressure; although always small at first, they frequently become so extensive, as to reach from one ear to another; and the skin usually retains its natural appearance to the last. The seat of this variety of the disease is evidently in the cellular membrane.

3. Instances have occurred of tumors forming in this situation, by the lining membrane of the trachea being forced out between two of the cartilages in violent fits of sneezing, coughing, and laughing. In this case the swelling is at first small; and although soft and compressible, no fluctuation is perceived in it.

4. The lymphatic glands of the neck have in some cases of scrophula become so swelled, as to produce tumors of considerable magnitude over the whole course of the trachea. They are distinguished by the symptoms which usually accompany scrophulous swellings.

5. The thyroid gland has in some instances been known to swell to a great bulk, so as to induce tumors of an enormous

mous size, extending from each side of the trachea to the angle of the corresponding jaw. In this variety of the disease, the swelling is at first soft; but no fluctuation is perceived in it; the skin retains its natural appearance; and no pain takes place in it: But as the tumor advances in size, it becomes unequally hard; being firm or elastic in some parts, and perfectly soft in others: The skin acquires a copper colour, and the veins of the neck become varicose; and in this state of the disease the face becomes flushed, and the patient complains of frequent head-ach, as well as of stinging pains through the body of the tumor.

This is mentioned by authors as that variety of the disease which occurs so frequently among the inhabitants of the Alps and other mountainous countries, and which in general is supposed to originate from the use of snow-water.

6. Whatever may be the nature of those varieties of bronchocele which occur in other kingdoms, I cannot pretend to say,  
but

but I have reason to think, that in this country the thyroid gland is not so frequently the seat of the disease as is commonly imagined. At least in all the instances I have met with of discovering the seat of the disease by dissection after death, the thyroid gland was not affected. In some this gland, instead of being increased, seemed evidently diminished by the compression produced by the tumor; and the swelling itself was chiefly formed of a condensed cellular substance, with effusions in different parts of it of a viscid brown matter. In one case the tumor was chiefly fixed on one side of the neck; but in others it occupied both sides, and reached from one ear to the other, and from the sternum to the chin. In some, the swelling had subsisted for a great number of years; and in one instance the patient died at last of another disease. At first they had no other appearance than might be expected from a natural increase in the parts lying contiguous to the trachea; they were soft and compressible;

but no fluctuation was perceived in them, and the skin retained its natural colour: But as they increased in size, they likewise became firmer; for although at last a softness, and even a fluctuation, was discovered in some parts of them, yet the principal part of the tumor continued hard, while others had a peculiar springiness or elasticity, similar to that of a tin canister: The veins on the surface of the tumors became turgid; and the face of a livid colour, evidently from the blood being impeded in its course from the head. All of these patients complained of much giddiness: The breathing in all of them was much obstructed; and the patient, who died of the disease, seemed to suffer chiefly from this circumstance.

With such varieties of bronchocele, no one mode of treatment it is obvious can be applicable. Hence the absurdity of specifics for this disease, such as calcined sponge and egg-shells, proposed and strongly recommended by many: For although this and other remedies might prove useful in



one variety of tumor, it would be absurd to suppose that they can be so as by many has been asserted in all.

1. In the aneurifinal bronchocele, the treatment suited to aneurism in general must be observed. To secure either of the carotid arteries with a ligature, must in all circumstances be a hazardous operation: But here there is no alternative; of whatever kind the aneurism may be, death will certainly ensue, if not prevented by this operation. This chance, therefore, ought always to be given; as in other cases of aneurism the artery should be tied both above and below the affected part.

I know from experiment, that one of the carotids may be tied in other animals, and that death will not ensue: This gives cause to suppose that it may likewise be done in the human body.

2. Where the disease is found to be formed by encysted tumors upon the trachea, what we have said upon the treatment of these tumors in general will prove applicable.

applicable \*. While small, the cysts with their contents may be removed in the manner we have mentioned: And even in the most enlarged state of them, we need not despair of being able to afford effectual relief. In those of the steatomatous kind, consisting entirely of fat, however large they may be, we may with safety attempt to remove them: For in almost every instance, the connection of tumors of this description with the contiguous parts is so slight, that they are removed with ease. The vessels on the surface of the tumor may be enlarged; but these are chiefly veins, and may be easily avoided. In tumors formed altogether of fat, I have never seen any of the arteries of such a size as when cut to give any disturbance; they are always small, and easily secured by pressure when they lie beyond the reach of ligatures.

3. When, again, the contents of a bronchocele are fluid, they may be discharged either by an incision with a scalpel, or by

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passing

\* *Vide* § 2. of this section.

passing a seton or cord through the cyst; and when the contained matter is of a pultaceous consistence, forming what is termed an Atheroma, it should be discharged by a large opening in the most depending part of the tumor.

4. Where the tumor is formed by a hernia or protrusion of the lining membrane of the trachea, gentle pressure with a roller is the only remedy to be depended on; and all such exertions should be avoided as might have any influence in producing it; particularly violent laughter, sneezing, coughing, and crying. Where the disease is scrophulous, we must depend chiefly on those remedies which prove most useful in other scrophulous affections: And with a view to remove the compression produced upon the trachea, as well as upon the veins returning from the head, the contents of the tumors should be discharged as soon as they appear to be sufficiently fluid.

5. Where the disease originates from tumefaction of the thyroid gland, frequent frictions.

frictions prove useful, particularly when employed early, before the swelling has become large; and saponaceous and mercurial plasters have in some cases appeared to prove serviceable. Practitioners, however, are seldom consulted in that stage of the disease in which remedies of this kind may be usefully applied: For as the swelling does not give uneasiness at first, it is seldom mentioned by the patient till it has subsisted for some time. In an enlarged state of this gland, I do not suppose that any remedy will ever be found sufficiently powerful to discuss it; so that the only points to be determined, are, whether or not we should attempt to remove these tumors by an operation? and whether it should be done with caustic or the scalpel?

We know that the thyroid gland is very plentifully supplied with blood, and that the arteries which belong to it are usually much enlarged in this disease. This, together with the contiguity of the thyroid gland to the carotid arteries, which in

this enlarged state of that gland are even apt to be compressed by it, renders the extirpation of it in an advanced period of the disease extremely hazardous. The arteries here are of such magnitude as to pour out a great deal of blood in a short space of time ; while they lie at such a depth in this enlarged state of the parts, that they cannot be easily laid hold of with ligatures, nor can much compression be applied to them from their situation with respect to the trachea. I therefore conclude, when tumors of this description have acquired any considerable bulk, that it would be improper to run the hazard of removing them with the knife, and that the patient should rather trust to the treatment usually employed in such cases for palliating the symptoms as they occur\*. And although we are informed, that

\* Mr Gooch relates a case, where in an attempt to remove a bronchocele by excision, such profuse hemorrhagy took place, that the operator, although very intrepid, was obliged to desist before the operation was half finished.



that in this situation the potential, and even the actual cauteries have been employed with advantage, yet the practice has not become so general as to make it probable that it has ever been successful; nor do I think that it should ever be advised in any stage of this disease.

But although the reasons I have mentioned may be sufficient for preventing the removal of these tumors in any way when much enlarged; yet while the tumor continues small; when frictions and other remedies fail; and when the disease is continuing to advance; I think any practitioner would be warranted in advising

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sing

finished. No means that were employed could put a total stop to the blood; and the patient died in less than a week.

Another case had very nearly terminated fatally; and the patient's life was only preserved by having a succession of persons to keep a constant pressure upon the bleeding vessels, day and night for near a week, with their fingers on proper compresses, after the operator had been repeatedly disappointed in the use of the needle and ligature.—*Vide* Gooch's Medical and Chirurgical Observations, p. 136.

sing it to be removed by excision: For in this early period of the disease, the difficulty of securing the arteries with ligatures is much less than it afterwards becomes; at least the risk occurring from this must be inconsiderable, when compared with that which must probably ensue from the tumor being allowed to remain.

In the sixth and last variety of the disease which I have mentioned, frictions with mercurial ointment have in its early stages appeared to prove serviceable. And in one case the progress of the tumor was evidently retarded by repeated blisters; but the patient going to a distance, they were neglected, and at last it arrived at a very enormous size. In this state I saw him at the distance of several years, but I did not learn in what manner the case terminated. I have reason to think, however, from the appearance of the swelling, both at its commencement and in its more advanced stages, that it proceeded from an effusion  
into

into the cellular substance of the neck, attended with that condensed state of this substance which was discovered by dissection in some of the cases mentioned above.

But however serviceable blisters, as well as other remedies, might prove in the early stages of the disease, no advantage can be expected from them when the tumor has acquired any great bulk. In this situation palliatives only should be employed; for the basis of the swelling usually runs so deep, that it could not be removed but with the utmost hazard; and it is not probable that any advantage would be derived from laying it open; for, a considerable part of it being firm and solid, the size of the tumor would not be much diminished by the discharge which might be procured, while the sore that would ensue might degenerate into cancer.

§ 12. *Of Nævi Materni.*

By Nævi Materni, are meant those marks which we frequently find in different parts of the body at birth; and which are supposed to originate from impressions made on the mind of the mother during pregnancy. They are of various forms, being frequently found to resemble strawberries and cherries, and in other instances grapes, figs, pears, &c. Their colour is various; but for the most part they are of a deep red, resembling the colour of claret or red port.

Many of these marks are perfectly flat, and never rise above the level of the skin; and not being painful, they never in this state become the objects of surgery. But occasionally we meet with them from the first in the form of small protuberances, which in some increase so quickly as to arrive at a considerable size in the course of a few months. I once saw a tumor of this kind in a child, of a year old, of the  
size

size of a goose's egg, which at birth was not larger than a pea.

No fluctuation is discovered in these tumors; on the contrary, they feel to be firm and fleshy. In some cases they are pendulous, and hang by slender attachments to the contiguous parts; but for the most part they are fixed by broad extensive bases.

Various remedies have been recommended for the removal of these excrescences; and in ancient times different charms were proposed for them. The mystery proceeding from this is perhaps one reason of the general aversion which still prevails against any attempt being made to remove them by surgical operations: But it has not appeared in the course of my observation, that more danger attends the removal of this kind of swelling than the extirpation of any other tumor of the sarcomatous kind. They are supplied indeed more plentifully than other tumors with blood; for in many instances they appear to be entirely formed  
by



by a congeries of small blood-vessels ; but the arteries which go to them are in general easily secured with ligatures. It is proper, however, to remark, that the operation should never be long delayed ; for as the size of the vessels depends upon that of the tumor, they sometimes become so large as to throw out a good deal of blood before they can be secured ; so that the operation should always be proposed as soon as it is observed that the tumor, instead of remaining stationary, proceeds to increase.

The operation is of a very simple nature. The tumor, with all the discoloured skin, is to be dissected off with a scalpel ; and the arteries being secured, the edges of the remaining skin should be drawn together, and kept in this situation either with adhesive plasters or sutures : Or, when they cannot be drawn completely together, they may at least be made to cover a considerable part of the fore ; by which the cure will be much shortened, and the cicatrix lessened. In  
this

this case, that part of the fore which is left uncovered must be treated like a wound from any other cause.

It is scarcely necessary to mention, that where the tumor is pendulous, and connected to the parts beneath by a narrow neck only, it may be removed by tying a ligature round it of a degree of tightness sufficient for putting a stop to the circulation through the whole of it.

### § 13. *Of Warts.*

WARTS are indolent, small, hard, colourless excrescences, which appear on different parts of the body, but chiefly on the fingers and hands. They take their rise from the cutis and cuticle. They occur at every period of life, but more frequently in infancy than in old age.

When from their size or situation warts do not prove troublesome, they should not be touched; for generally in course of time they either fall off or waste gradually

dually away. But sometimes they are so large and so situated that we are under the necessity of employing means for removing them.

When warts are pendulous, and have narrow necks, the easiest method of taking them away is with ligatures: For this purpose a hair is sometimes used, but a fine thread is preferable. But when their bases are broad, we remove them either with the scalpel or escharotic applications. Few patients, however, will submit to the scalpel; and as we seldom fail with escharotics, they are generally employed.

The lunar caustic, or lapis infernalis, are the strongest applications of this kind; but warts commonly become very painful after being two or three times rubbed with them. The same objection occurs to a solution of quicksilver in aquafortis, otherwise it proves a very powerful escharotic. Mercury dissolved in an equal quantity, or even in double its weight, of strong spirit of nitre, would remove warts  
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of every kind ; but as the solution is apt to spread, it should be used with caution. Pulvis sabinae being daily applied to warts, will for the most part remove them in the course of two or three weeks ; but the best application I have tried is crude sal ammoniac : It acts slowly, but the pain which it excites is inconsiderable, and excepting in the very hardest kind of wart, it seldom fails in removing them. They should be well rubbed two or three times daily with a piece of the salt previously moistened in water. Liquified salt of tartar sometimes answers the purpose ; and I have known spirit of hartshorn prove successful.

Warts frequently appear upon the penis as a symptom in venereal affections, and as they are nearly of the same nature with those we have been considering, the same method of treatment will apply to them. In general, the tendency in the system to produce them does not continue long ; and if the parts are kept clean, they at last often begin to decay, and go  
entirely

entirely off whether any application is made to them or not. But as patients are always anxious to get free of them, practitioners are sometimes induced to make trial of remedies too early, for till this tendency to their formation is removed, warts rise almost as quickly as they are rubbed off. Nor has mercury any influence in preventing this: I have known mercury advised for the removal of warts; but never with any advantage. When we have reason to suppose, therefore, that every other symptom of the disease is eradicated, the continuance of warts should be no inducement to the exhibition of more mercury,

When venereal warts are tender on the surface, and produce matter, as is sometimes the case, washing them morning and evening in lime-water, or in a weak solution of *saccharum saturni*, will commonly remove this; and at last they will disappear in the manner I have mentioned. But when this delay will not be agreed to, one or other of the escharotics mentioned



tioned above must be employed; or if the patient consents to their being removed with the scalpel, the parts from whence they are cut may be touched with lunar caustic, in order to prevent them, with as much certainty as possible, from returning.

It is proper to remark, that in the treatment of warts of every kind, we should be cautious in avoiding every application which we have once observed to excite much inflammation; for although under a slight degree of inflammation, warts very commonly decay and drop off, they are apt to spread and excite troublesome sores when much inflamed by the use of irritating applications. For the same reason, when a wart is to be removed with the scalpel, we should rather encroach a little upon the sound skin, than run any risk of injuring the wart itself, or of leaving any part of it. By want of attention to this, I have known the most formidable symptoms induced by what at first appeared to be such a trifling excres-

cence, as not to deserve notice. In one case, indeed, such a painful obstinate sore ensued on the leg, from the removal of a small wart, that amputation of the limb became necessary, in order to save the life of the patient.

§ 14. *Of Fleshy Excrescences.*

ALMOST every part of the body is occasionally liable to the formation of fleshy excrescences. They differ from warts in being softer, and in being apt to acquire a considerable bulk. They are seldom painful. They are of a more deep red colour than the skin in health, and for the most part they have a firmness of consistence resembling that of the lips. When first laid open, they exhibit nearly the same appearances with a piece of muscular substance newly divided; but on farther examination, no fibres can be discovered in them. They seem to consist chiefly of cellular substance, very plentifully

tifully supplied with blood-vessels infinitely ramified.

In the treatment of these tumors, no external application is found to answer any good purpose. Escharotics have sometimes been employed for removing them; but they seldom prove effectual, and they are apt to irritate and excite inflammation. Whenever it is determined, therefore, to remove a tumor of this kind, it should either be done with a ligature, or with the scalpel. When the neck is narrow, the method by ligature should be preferred; but when the base is broad, this is inadmissible. When the scalpel is employed, care should be taken that no part of the tumor is left; and the edges of the divided skin should be drawn so together, as to cover as much of the remaining sore as can with propriety be done. When any part of it does not heal by the first intention, it must be treated like wounds produced in any other manner.

§ 15. *Of Corns.*

CORNS are small hard tubercles, which form on different parts of the body, particularly on the toes and soles of the feet. In some cases they appear to be of a horny inorganic nature; but in others, it is evident that they are supplied both with blood-vessels and nerves, from their being painful, and discharging blood on being cut. For the most part they are seated in the skin; but in some instances they pass to such a depth as to reach the periosteum; and in this case they prove always very distressful, particularly when seated on any of the joints, or on parts thinly covered with flesh.

The best preventative of corns, is the wearing of wide shoes, so as to obviate pressure on the joints of the toes and other parts of the feet where they are most apt to occur; and unless this meets with attention, it is impossible in any case to remove them. Various remedies are recommended

mended for the cure or removal of corns. One of the most simple and inoffensive of these is to pare off all the inorganic part of them, after bathing in warm water, and immediately thereafter applying over them slips of soft leather spread with gum plaster. If the soaking in water and paring the corns is repeated from time to time, and the application of this plaster continued, the corns will be kept easy, and the hard knots will often separate and fall out; when, if pressure is avoided, the vacancy produced by their removal will fill up with cellular substance, and no return of the disease will be experienced.

Corns may also be removed by dividing the cuticle which connects them to the surrounding parts with a small sharp-pointed scalpel, and then dissecting them from the parts beneath with the same instrument and the assistance of small forceps. When done with caution, this operation gives no pain, no harm ever arises from it, and it removes the disease in the speediest



manner: Much care, however, is necessary in order to avoid the cutis vera, for in wounding the skin, we not only excite a good deal of pain, but are apt to lay the foundation of tedious and distressful ulcers: Neither is it necessary to go to such a depth, as corns are always produced from the cuticle, and do not penetrate deeper than the surface of the skin.

§ 16. *Of a Simple Exostosis, Venereal Nodes, and Spina Ventosa.*

AN Exostosis is an indolent hard tumor originating from a bone. In some cases it is altogether a local affection; being produced by a superabundance of callosity in cases of fractured bones; or by bones being deeply wounded, or their substance eroded by ulcers. In others, it appears as the symptom of some general affection of the system, particularly of the lues venerea and scrophula. In the first  
of

of these diseases, the tumor is termed a Venereal Node. When it appears as a symptom of scrophula, we usually term it Spina Ventosa.

Exostosis, when local, and proceeding from effusion of osseous matter in fractured or wounded bones, is seldom attended with pain; and after arriving at a certain size, the tumor commonly remains stationary. But when it originates from an internal cause, it is commonly painful from the first; probably from the distention of the periosteum, which being a firm membrane, and closely attached to the bone beneath, does not readily yield to the increase of the tumor. And in this case the swelling continues to advance, either till it bursts into a sore, or till the disease in the constitution by which it was produced is eradicated.

In venereal nodes, the periosteum is often found inflamed and thickened; and in some cases a small quantity of thin acrid serum is effused between this membrane and the bones. Hence, in these, the swell-

ling in the bone appears to be larger than it really is; for on being laid open, it is often found to be inconsiderable when compared with the previous size of the tumor. This has made some suspect that the swelling which we term a Node in lues venerea, is not originally an affection of the bone, but a thickening of the periosteum, and that the bone only suffers from its connection with this membrane. There is much reason, however, to imagine, that the reverse of this is the case, and that the bone is the part primarily affected. For it is worthy of remark, that it is in the advanced stages of syphilis only, that the bones are apt to be affected; and even then, that it is the hardest parts of them, such as the fore-part of the tibia and bones of the cranium, which are most apt to suffer.

In scrophula, we frequently find the whole substance of a bone become swelled, particularly the extremities of the large bones forming the joints of the knee, ankle, elbow, and wrist. Various conjectures

tures are met with in authors of the origin of the term *Spina Ventosa* given to this swelling; but whatever may have been the first cause of it, or whether properly applied or not, we think it right to retain it, in order to prevent that confusion which ensues from different names being given to the same disease.

In *spina ventosa*, a pain is first discovered in the affected bone, and it is usually so deeply seated, that the patient is led to think from his feelings, that it proceeds from the very centre of the bone. This sometimes takes place for several days before any swelling is perceived: but for the most part a slight degree of fulness is observed from the first. When this takes place along with other symptoms of scrophula, and especially when it fixes on any of the large joints, there will be cause to consider it as a symptom of that disease: But it often proves to be the first symptom of scrophula, especially in childhood: In which case both the parents and surgeon are apt to suspect

suspect that it proceeds from a contusion or sprain ; nor does the delusion cease with the former, till the disease becomes evident by fixing on other parts of the body.

When *spina ventosa* occurs in the middle of bones, as sometimes happens in the bones of the hands and feet, the disease advances quickly ; and on the soft parts bursting above them, a thin, ill-conditioned matter is discharged, and the bones are discovered to be carious on the introduction of a probe. But when the disease fixes on any of the large joints, although it seldom fails to terminate in sores at last, yet it commonly proceeds to an ulcerated state in a more gradual manner ; nor does any remedy with which we are acquainted prevent its progress. In this situation it lays the foundation of what is usually termed a White Swelling ; a disease we have already considered at full length \*.

When these swellings burst and terminate in sores, the soft spongy parts of the bones

\* *Vide* § 9. of this Section.



bones are found to be dissolved; and on the matter which they produce being discharged, the remaining cavities have the appearance of being formed by the interior part of the bones having been scooped out, there being nothing left but a thin osseous covering, formed of the hard external lamella of the bone. In this state of the disease, the appearances which the bone exhibits bear much resemblance to scrophulous sores in the softer parts of the body: And as the spina ventosa is almost always in some of its stages accompanied with other symptoms of scrophula, I am clearly of opinion, that we should consider it entirely as a scrophulous affection, this being the same in the bones what scrophula in its more usual form is in the lymphatic glands.

In the treatment of an exostosis, the cause by which the tumor has been induced requires particular attention. Where perfectly local, and formed merely by an exuberance of callus, although some deformity may ensue from it, it is seldom  
productive

productive of so much pain or inconvenience as to induce the patient to speak of it. But when tumors, even of this local kind, become so large as to prove painful, they necessarily excite the attention both of the patient and practitioner. Being of a nature that will not yield to medicines, we trust entirely, in those cases where it is necessary to remove them, to a surgical operation.

The patient being placed upon a table, and properly secured by assistants, if there is any risk of contiguous large arteries being cut, they ought in the first place to be secured with a tourniquet: An incision should now be made through the teguments covering the tumor; and in order to obtain freedom for the remaining steps of the operation, it should not only be carried along the whole course of the swelling, but an inch or even more past each end of it. The cut should now be continued down to the bone, at the same time that the operator should avoid as much as possible doing any injury to the  
contiguous

contiguous muscles, tendons, veins, arteries, and nerves. With due attention to this part of the operation, much distress may be prevented, which might probably occur were it to be done in a more hurried manner.

On the bone being laid bare, we are next to determine on the best method of removing that part of it which forms the tumor: And this will depend upon the size of it. When only a small knob, it may be taken off with the head of a trepan: or when too large for this, it may be removed with a common saw; and after taking away any spiculæ which might create irritation, the sore may be treated like wounds produced in any other manner. The soft parts should be drawn over the bone, and the edges of the skin being laid together and secured with adhesive plasters, a cure may possibly be obtained by the first intention. In some cases, indeed, this may be prevented by small exfoliations taking place from the site of the tumor. I know, however, from experience,

rience, that it will sometimes succeed, and therefore I would always advise it to be attempted; for even where small exfoliations take place, the pieces of bone will be forced to the surface, and may be afterwards taken out long after the cure of the soft parts is completed.

An exostosis, however, is sometimes found to surround a bone entirely. In this case the treatment now advised will not apply. In this situation, that portion of the bone must be taken out on which the exostosis is fixed, when the bone is of such a length and so situated as to admit of it: But as this can scarcely be done in the small bones of the hands and feet, when any of these are affected, it becomes necessary to remove the diseased bone entirely. In a case of this kind which occurred in one of the metatarsal bones, and where the exostosis surrounded the whole circumference of the bone, I thought it better to take out the bone altogether, than to leave the two ends of it only. The one operation was performed with  
no

no great difficulty: the other would have been more painful as well as much more tedious, and it would not have proved more successful. For although the part did not fill up with bone, it became sufficiently firm to enable the patient to walk as well as he did before.

In the long bones, however, of the thighs, legs, or arms, we may safely venture to remove any portion of them on which an exostosis is fixed: and where the constitution is healthy, we need never despair of nature supplying the deficiency; for instances are often met with, even of entire bones being regenerated. When a portion of bone is to be removed, after laying it freely bare by an extensive incision, a piece of pasteboard, or thin sheet-lead, should be passed beneath it, in order to protect the contiguous parts from the teeth of the saw. Where a portion of the fibula or tibia is to be removed, the splint must be passed between these bones; and when either of the bones of the fore-arm are affected, it must pass between the radius

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dius and ulna. Different forms of saws have been employed for dividing bones affected in this manner; but the common saw used in amputations answers better perhaps than any other.

When the portion of bone is removed, the fore should be dressed with the mildest applications; a piece of soft lint spread with common wax liniment, or merely dipped in oil, should be inserted between the lips of the wound; and if any thing is employed for retaining them, it should be the many-tailed bandage, which can be undone without moving the limb. It is a point of importance to place the limb in a situation the most favourable for the discharge of matter; and as the operator has it commonly in his power to make the wound more or less inclined to any side of the limb, this circumstance should be attended to in the first part of the operation.

When the operation has been performed upon either of the bones of the leg or fore-arm, the remaining sound bone will  
keep

keep the limb at its full length, so that there will be no risk of its becoming shorter. But when a portion of a single bone is taken out, some attention is required to prevent the limb from becoming shorter during the cure. For this purpose different machines have been invented; but I have never found any assistance of this kind necessary: For if the patient is informed of the great importance of keeping the limb in a proper posture, he will give it all the attention that is requisite: And besides, much inconvenience, pain, and inflammation, are apt to ensue from any instrument employed for this purpose, when applied with a degree of tightness necessary for keeping the limb in a state of extension.

During the cure of the fore, the chief object is to prevent matter from lodging and passing between the contiguous sound parts. If this is prevented, and the lips of the wound kept open by the easy dressings I have mentioned, till it fills up with granulations from the bottom, nature will

accomplish the rest. Those soft granulations which at first occupied all the vacancy between the ends of the divided bones, will soon acquire the consistence and strength of bone; and in the course of a short time, if the general state of health continues good, the limb will become equally useful as it was before.

Hitherto we have supposed the disease to be seated in the extremities. But tumors of this kind are also found in other parts of the body: on different parts of the skull; on the under-jaw; on the ribs and clavicles; and I once saw a large exostosis on the upper part of the scapula. But wherever they are situated, the treatment is the same. While they give no uneasiness, nothing should be done; for they will sometimes continue small and stationary for life: But when they increase and prove troublesome, the sooner they are removed the better; for the earlier the operation is performed, the more easily will it be done.

In that variety of exostosis termed a Node, proceeding from lues venerea, the first point to be determined is the state of the system. The patient should be immediately put upon such a course of mercury as can be depended upon for the removal of any infection he may labour under; and if the tumor in the bone is recent, and not far advanced, any pain which it has induced may be removed by mercury alone. With a view, however, to make the medicine as effectual as possible, it should be thrown in as quickly, and in as great quantities, as the patient can bear: for as the system is completely infected with the virus before nodes appear, it requires, for the most part, a very considerable quantity of the medicine to check their progress.

At the same time that mercury is given inwardly, it is a common practice to rub the part itself with mercurial ointment, or to keep it covered with mercurial plaster. I have not observed, however, that any advantage is derived from

this ; and I think it is apt to do harm. In tumors of this kind there is reason to suppose that the periosteum becomes inflamed from the fist. In different instances, the inflammation has appeared to be aggravated both by the application of plasters, and by the friction used with mercurial ointment. Till we know whether the internal exhibition of mercury is to prove effectual or not, some mild sedative application, such as saturnine solutions, or the unguentum nutritum, which is a preparation of lead, should only be employed. These keep the parts easy ; and by tending to remove inflammation, they may even have some influence in removing the tumor.

But if we find, after there is full evidence of the mercury having entered the system, that the local affection of the bone still continues to advance, that the tumor becomes larger and the pain more severe, other remedies should be advised. In this situation, I have sometimes found the pain relieved immediately by the application



tion of leeches over the tumor; and the pain being moderate, we have it thereby in our power to delay every other remedy till a more complete trial is given to mercury. In some cases, where leeches have failed, blisters applied directly upon the parts affected have proved successful. Neither blisters, however, nor leeches can have any influence on the original disease: they will not lessen the tumor of the bone; but by lessening the tension of the periosteum, they sometimes prove more useful than perhaps any other remedy we could employ.

When these means, however, are too long delayed; when the tumor advances with more rapidity than usual; or when acrid matter is perhaps confined beneath the periosteum; neither leeches nor blisters afford relief. In such cases, an incision made along the course of the tumor to the depth of the bone, will often give immediate ease. The matter evacuated from these tumors is frequently a thin

brown sanies, at other times, a viscid transparent mucus.

In some cases the incision heals kindly by common treatment, even when the tumor of the bone is by no means inconsiderable. Healthy granulations will form, and a cure of the sore will be accomplished, even before the patient has taken as much mercury as may be judged necessary for the cure of the disease. In such cases, the tumefaction of the bone is not to be regarded: It may probably, indeed, continue during the life of the patient; but no inconveniency will afterwards ensue from it. So that unless it is so situated as to produce much deformity, it should never be touched.

But, in other instances, the sore, instead of healing easily, remains obstinate, notwithstanding all the remedies we can employ. In such circumstances, this obstinacy of the sore is for the most part supposed to arise from the venereal virus not being destroyed, and a farther continuance of mercury is therefore advised. The  
mercurial

mercurial course should no doubt be carried so far as there is any chance of its proving useful. But beyond this, it will commonly prove hurtful, and rather tend to protract the cure of the sore. This, however, is a point upon which no precise directions can be given, and must be determined by the judgment of the practitioner in attendance.

When the obstinacy of sores in this situation depends upon other diseases of the system, the removal of these will forward the cure. But when there is a tendency in the diseased bone to exfoliate, the completion of this process will alone prove effectual. In such circumstances, the treatment best fitted to promote exfoliation ought to be pursued: But as we shall elsewhere have occasion to consider this subject more fully, it is unnecessary now to enter upon it \*.

After all the diseased parts of the bone are removed, the sore will for the most part heal easily. But in some cases, such

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\* *Vide* Chap. IV. Sect. VII.

a thickening of the periosteum and contiguous parts has been produced by the long continuance of the disease, that the cure still proceeds slowly. In such circumstances, mild emollient applications do harm, and nothing in general proves so useful as ointments strongly impregnated with red precipitate or verdigris. In some cases, even these do not act speedily; when touching the surface of the sore, once in two or three days, with lunar caustic or lapis infernalis, will make the sloughs throw off; and for the most part their place will be supplied with healthy granulations; after which, the cure commonly proceeds without interruption.

In describing this variety of exostosis, we have repeatedly mentioned the pain which attends it; a symptom which always takes place; at least I never met with an instance of the contrary. Venereal nodes, particularly those on the head, are not indeed always accompanied with much pain, but merely with a slight uneasiness. This variety, however, of node  
does

does not originate from the bone, but proceeds merely from an affection of the periosteum. In this case the tumor commonly subsides entirely, either by the effects of mercury alone or the application of a blister: But in the other, if the bone is affected in any considerable degree, the tumor never subsides, if a large portion of the bone does not exfoliate. Even after every other symptom of the disease is removed, these tumors in the bones continue equally fixed and large as they were at first. We judge that a node proceeds from the bone itself; by the pain, as we have just observed, being acute; by the tumor being considerably harder than when the periosteum only is affected; by its advancing more slowly than the other, and continuing fixed and permanent, notwithstanding all the applications we make to remove it.

We come now to speak of the treatment of *spina ventosa*, or that variety of *exostosis* which we suppose to originate from *serophula*; and I am sorry to observe, that



I have nothing satisfactory to offer upon it. Fomentations, ointments, plaisters, and a variety of other remedies, have been recommended ; but I know of none that any advantage has ever been derived from. Tumors of this kind which appear formidable at first, will sometimes indeed continue stationary, either from the scrophulous disposition in the system being checked by cold bathing, or some other similar remedy ; or from some change taking place in the constitution, with the nature of which we are perhaps altogether unacquainted. But this is a rare occurrence : For in general, notwithstanding all the remedies we employ, a *spina ventosa*, from its first appearance, proceeds in a gradual manner to become worse.

When the disease appears at the same time in different parts of the body, all we can with propriety attempt, is to support the constitution with a proper diet. To advise bark and cold bathing as the best strengthening remedies ; and when the pain is severe, to endeavour to render it moderate

moderate by adequate doses of opium. But when confined to one part, as often happens in the knee and other large joints in cases of white swelling, it becomes frequently advisable to remove the diseased part by an operation. In affections of the joints, it has been the common practice in this situation to amputate the diseased limbs entirely. But an attempt has lately been made by Mr Park, an ingenious surgeon of Liverpool, to save limbs that are thus diseased, by removing the heads of the affected bones only, and afterwards healing the sore at which they were taken out. In treating of the operation of amputation, I shall enter more fully into the consideration of this; for it is highly deserving of notice: At present I shall only remark, that there is cause to fear that it will not prove so generally useful, as at first view might be expected. But where these swellings occur on the middle of bones, the practice may be pursued which I have already advised in those cases of exostosis proceeding

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ing from external violence : The swelled portion of bone may be cut out when seated on any of the long bones of the extremities ; and the whole bone may be removed when any of the short bones of the hands or feet are affected.

C H A P.

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CHAPTER III.

Of WOUNDS.

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SECTION I.

*Of Wounds in general.*

**V**ARIOUS definitions have been given of a wound ; but few if any of them appear to be exact. Boerhaave defines a wound to be, a recent, bloody solution of continuity, in any soft part, by the motion, pressure, or resistance of some hard or sharp body. By Sauvages, it is said to be a mechanical division of any fleshy part, attended with a separation of the parts newly divided, together with a discharge

discharge of blood and a tendency to inflame and suppurate. And Ludwig defines a wound to be a morbid division of parts which in a state of health ought to be united.

These are the definitions of this term which have been most generally adopted; but it is evident that none of them are correct. A part may be deeply cut, even large blood-vessels may be divided, without any discharge of blood taking place, as sometimes happens in lacerated wounds, and in those attended with much contusion: And where the smaller vessels only are divided, the discharge of blood very commonly ceases in the course of a few hours from the time that the wound was inflicted.

The definition recited above from Mr Sauvages is too extensive: It comprehends a period or stage of wound which does not always exist, viz. a tendency to suppurate. We know that wounds frequently terminate in gangrene, and even in death, without any previous suppuration; while



while in other instances they heal by the first intention, and their edges adhere to each other without any appearance of pus.

Neither is Dr Ludwig's definition of a wound correct: Parts which ought to be united, may be divided without being wounded. Thus a blood-vessel, nerve, tendon, or muscle, may be completely ruptured either by a violent sprain or a contusion; but unless the corresponding skin and other teguments are divided, we do not say that such parts are wounded. Nor are these affections confined to the smaller muscles and tendons; for instances often occur of the different parts even of the largest muscles being thus violently separated from each other.

Every recent solution of continuity in the softer parts of the body, when attended with a corresponding division of the teguments, may be denominated a wound.

From this definition of wounds, it is evident that they will exhibit much variety in their nature and appearances.

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This will arise from different causes, but more particularly from the nature of the injured parts ; from the manner in which they have been produced ; and from their extent.

Thus wounds in muscular parts are different, both in their nature and appearances, from such as affect membranous or tendinous parts only. Wounds made with a sharp cutting instrument are materially different from such as are attended with contusion or laceration : And punctured wounds exhibit very different appearances, and for the most part are productive of very different effects, from such as are more free and extensive. In the subsequent parts of this section these varieties in wounds will be considered. In the meantime, we shall give a description of the phenomena which usually take place in the most frequent form of this affection, what may be termed a Simple Incised Wound ; by which both the theory and practice which we mean to inculcate will be rendered more intelligible.

On the instrument being withdrawn with which an incised wound has been made, the first appearance we take notice of is a separation to a certain extent of the divided parts; which is always in a greater or lesser degree, according to the depth and length of the wound, and according as the fibres of the injured part are divided more or less transversely. Thus a wound even of considerable length, if it runs in the same direction with the fibres of a muscle, will be attended with little retraction of the skin, while a large vacuity will take place in a wound perhaps of less extent where a strong muscular part is cut directly across. Nay, in this last case, the separation of the divided parts is in some cases so considerable, as to give cause to suspect that a portion of them has been removed; while in the other it is often so trifling, that even an extensive wound will have the appearance of a straight line only; a circumstance by which practitioners have been often led to consider as of no great importance, wounds

which in their consequences have proved to be formidable; and by which the propriety of examining every wound with attention is strongly pointed out.

The next appearance which usually takes place in wounds, is a discharge of blood to a greater or lesser extent, in proportion to the size of the cut, and to the number and size of the vessels that are divided; at least this is the case in wounds made with a sharp cutting edge. Where the parts have been much bruised or lacerated, we have already remarked, that even large blood-vessels may be divided without any hemorrhagy ensuing.

For the most part, the discharge of blood proves so alarming that means are employed to stop it; but when this is either neglected or not considered as necessary, if the arteries that have been cut are not large, the irritation produced by the wound itself, as well as by the free access of the external air, excites in the divided extremities of these vessels such a degree of contraction, that in this way  
alone

alone the hemorrhagy is soon checked. The discharge of red blood becomes gradually less: It then ceases entirely, and is succeeded by an oozing of a ferous fluid, which in the course of a few hours likewise stops, when the whole surface of the fore is found either somewhat dry or even parched; or it is covered over with a cake of coagulated blood.

In this way nature seems to operate in putting a stop to hemorrhagies produced by wounds. Another idea is commonly entertained indeed of this salutary process: It is supposed that small coagula of blood plug up the orifices of the vessels, and that in this manner they are preserved of the same size as before they were divided.

This, however, is by no means the case, as is clearly proved on dissecting the stumps of patients dying after amputations. Instead of the mouths of the divided arteries being plugged up with blood, they are found perfectly empty and contracted for a considerable space



from their extremities ; nay, in most instances, they become firm solid cords, so as never afterwards to be capable of receiving a supply of blood. Nor is this process of nature difficult to explain. It is arterial hemorrhagies we are now considering ; for wounded veins, if they be not compressed between the injured part and the heart, seldom discharge so much blood as to prove alarming. Now, as arteries are possessed of a strong contractile power, they will readily exert this power on the irritating causes which accompany wounds, being applied to them. In this manner the blood is prevented from flowing in its usual channel ; but nature does not fail to provide a different route for it : It is soon forced through the contiguous anastomosing arteries, which at last become so much enlarged, as to allow it to pass with freedom ; while, in the mean time, that contraction of the divided arteries, produced at first, as we have observed, by irritation, terminates at last in a firm adhesion of their sides, in consequence of  
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that inflammation with which every wound is in some degree accompanied.

The pain attending a wound made with a clean cutting instrument, is in general inconsiderable at first, unless a nerve or a tendon has been partially divided; in which case it proves commonly severe. But in every wound the parts become painful in the course of a few hours from the time of the injury being inflicted. They become red, tense, and even considerably swelled: And where the wound is extensive, an increased degree of heat takes place, together with thirst, quickness of pulse, and other symptoms of fever.

In some instances these symptoms continue to increase, and to prove more and more severe, till at last they terminate in mortification; but for the most part they are carried off in a more favourable manner. The surface of the wound, which for some time remained perfectly dry, is gradually rendered moist and soft by a thin serum oozing into it; which being

allowed to collect, is at last, by the heat of the affected parts, and in some cases by the application of artificial heat, converted into purulent matter: while in general, the preceding symptoms of pain, tension, and fever, abate more or less quickly according as this formation of matter is more or less plentiful. From the time that serum begins first to ooze into the cavity of a wound, the tension and pain begin to abate, and for the most part these symptoms disappear on a free suppuration taking place, by which the most natural balsam is produced that can be applied to wounds.

From this history of the progress of wounds, it is evident that all the symptoms we have enumerated, are such as originate from inflammation. They are exactly such, indeed, as accompany a common phlegmon. The pain, redness, and tension, which always to a certain degree take place in wounds, are the leading symptoms of phlegmon; and the serous effusion into the cavities of wounds, with  
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the suppuration which ensues, are circumstances exactly similar to those which occur in all cases of abscess. A wound may therefore be considered as an exciting cause of inflammation; and some advantage, I think, may be derived in practice, from viewing it chiefly in this light. This, however, will more clearly appear, when we come to speak of the method of cure; when it will be rendered obvious, that in the treatment of wounds, those means prove uniformly most effectual which are most powerful in preventing violent inflammation.

The description I have given of wounds relates to the most simple and least hazardous kinds of them; in which the injury has been done, as was already remarked, with a sharp cutting instrument, and where the parts have been laid freely open. In such circumstances, when no organ of much importance to life has been divided, and when the cut is seated in a fleshy muscular part, if nature be not impeded in her operation, the whole sur-

face of the sore becomes covered with granulations almost immediately on a free suppuration taking place; and these continuing to advance, a cure is at last accomplished, in the manner to be described in a subsequent part of this work \*.

This happy termination of a wound, however, may be prevented by various causes. It requires, indeed, the concurrence of many circumstances. These we shall afterwards have occasion to treat of in a particular manner. At present I shall enumerate those only which arise from the nature of the wound.

In a free incised wound, the inflammation which takes place is not in general more than is necessary for the production of that degree of suppuration which we have shown to be requisite; and in wounds of this description, the matter gets freely off, being commonly discharged almost as soon as it is formed, points of the utmost moment

\* Vide Chap. IV. Section II. § 2.



moment in the management of wounds. It is known indeed to every practitioner, that the cure of wounds cannot be accomplished when the inflammation either runs too high, or when a free outlet is not given to the discharge : Every circumstance therefore in the nature of a wound, which tends either to excite an undue degree of inflammation, or to produce a lodgment of matter, must be considered as unfavourable : And hence punctured wounds, and those that are attended with contusion or laceration, are particularly hazardous.

Punctured wounds prove often more dangerous than wounds of greater outward extent, from large blood-vessels and other deep-seated parts being hurt ; and they are commonly more painful, being frequently attended with a partial division of contiguous nerves or tendons ; a circumstance productive of more violent pain than usually ensues from a free division of them. But the greatest risk in a punctured wound arises from the  
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lodgement of matter ; a circumstance which takes place more readily in this than in any other variety of wound ; and to obviate which, the nicest attention on the part of practitioners is often requisite.

In contused and lacerated wounds, if the violence with which they have been inflicted has not been considerable, the parts will frequently recover their tone ; the attending inflammation will not run high ; and a free suppuration being induced, a cure will at last be accomplished in a manner similar to what we have described in cases of simple incised wounds. But it often happens that the contiguous parts are so much injured as to give no cause to expect such a favourable event. When violently contused, the texture of the parts affected is sometimes so completely destroyed, that the circulation is stopped, and mortification ensues ; and where this proceeds to any considerable extent, the danger attending it is always great. Again, in wounds attended with  
much

much laceration, mortification is apt to occur from a different cause. The pain and irritation attending them proceeds sometimes to such a height, as to induce a great degree of inflammation; which, notwithstanding the means usually employed to prevent it, very frequently terminates in the manner we have mentioned. Indeed, so far as my observation goes, inflammation induced by this cause is more apt to terminate in gangrene than any other inflammatory affection proceeding from external violence.

In forming a prognosis of wounds, the circumstances we have just been considering merit our particular attention: But there are others which should likewise be kept in view; and these more especially are, the age and habit of body of the patient; the texture of the wounded part; the part of the body in which the injury is inflicted; and the risk of parts of much importance to life being ultimately brought to suffer, although not immediately injured.

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Thus, it is obvious, that in healthy constitutions, wounds will, *cæteris paribus*, be less hazardous than in people of diseased habits of body ; for we commonly observe, where the system is tainted with any disease, that even the slightest wounds are apt to become troublesome, and to degenerate into sores which do not heal till the disease of the system is removed : We also observe, that the healing of sores depends in some measure upon the age of the patient ; and that the cure is for the most part more quickly accomplished in youth and in middle age, than in very advanced periods of life.

There are many exceptions, however, to this ; for whenever the natural firmness and elasticity of the muscular fibres are not much impaired, we do not find that old age proves unfavourable to wounds. When the constitution is such, that any wounds which take place, are found to excite a due degree of inflammation, old age ought by no means to be considered

considered as a disadvantage. On the contrary, in such circumstances, it proves always salutary, by tending to render the symptoms more moderate than they are apt to be in more early periods of life. This is particularly the case in extensive wounds of every kind: And we observe it in a remarkable manner in chirurgical operations; especially in lithotomy, and in the amputation of any of the extremities; which have commonly, in the course of my experience, proved more successful in healthy old people than at any other period of life, and evidently from the cause I have endeavoured to point out.

With respect to the texture of a wounded part, it is well known that wounds heal not only more quickly but more kindly in some parts than in others. Thus wounds of the cellular substance heal more easily than such as pass through any of the muscles; while those that are confined to the fleshy parts of muscles prove much less formidable than wounds of tendinous or ligamentous parts; for, besides  
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occasioning less pain and inflammation, they do not so readily produce any permanent inconvenience. The deepest cuts may be inflicted on the belly of a large muscle, with little or no risk of any inconvenience being experienced from them; but the contiguous joints are apt to remain stiff and unmanageable, when the tendons which pass over them are much injured.

When wounds penetrate to a still greater depth, so as to do any material injury to bones, they prove always more tedious and uncertain than when soft parts only are divided; for in such cases wounds seldom heal till some portion of the bone exfoliates; a process which very commonly requires a considerable length of time to accomplish \*.

Wounds in glandular parts are more to be dreaded than the mildness of the symptoms which appear at first would lead us to imagine. When small glands only are divided, they often heal readily; but when the

\* *Vide* Chap. III. Sect. VII.

the larger glands are injured, the system is not only apt to suffer from the secretion for which they are intended being impeded, but the sores which ensue very commonly become fungous, and are cicatrised with difficulty.

When any of the larger lymphatic vessels are wounded, the cure often proves tedious from a constant discharge of a thin limpid fluid, by which the formation of a cicatrix is prevented: And when at last a cure is obtained, very troublesome swellings are apt to occur in the under part of the limb, from the obstruction given to the lymph in its passage to the heart by the newly formed cicatrix. Of this every practitioner of experience must have seen some instances. I have met with many; particularly after the extirpation of schirrous glands when deeply seated in the arm-pit. In such cases the large lymphatics of the arm are very frequently cut, and very obstinate œdematous swellings of the whole member are apt to ensue.

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When a large nerve is completely divided, the pain attending it will be inconsiderable; but the parts beneath will be deprived both of their sensibility and power of motion, unless they are supplied with some other branches. But when a nerve is only punctured, the pain which takes place is commonly severe: And this is apt to be followed with a high degree of inflammation; smart fever; subfultus tendinum; convulsions; and even death. These violent appearances, however, do not often occur in northern climates; but they are frequent in warm countries, where they are apt to terminate in a symptom which often proves fatal, the locked jaw.

In wounds of the larger blood-vessels, our first object is to discover, whether the hemorrhagy which ensues, proceeds from arteries or veins; for in general no material inconvenience is experienced from wounds even of the largest veins, while much danger is to be dreaded from wounds of the larger arteries. If  
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the artery is so situated that a ligature cannot be put round it, the loss of blood will probably soon prove fatal: And even where the discharge of blood can be stopped with ease, if the limb has no other artery to supply it, a mortification is to be dreaded. It often happens, indeed, even that large arteries are secured with ligatures without any detriment to the parts beneath: But in this case there are other arteries or anastomosing branches of such a size as to give passage to a sufficient quantity of blood.

The site of a wound is also an object of importance. Thus wounds in the extremities, when confined to parts lying above any of the hard bones, are not to be considered as so hazardous as those which pass into any of the joints: And in other parts of the body, wounds which penetrate any of the larger cavities, prove always more dangerous than those which do not run to such a depth.

This will proceed from different causes. The danger will be increased by the

chance of some organ of importance being directly injured : By air, and in some cases by extraneous bodies, finding access to cavities which nature never meant to be exposed : And lastly, by the lodgement of matter ; a circumstance always with much difficulty avoided in wounds which penetrate to such a depth.

We have likewise to consider, that although no organ of importance may be directly wounded in such a manner as to produce immediate death, yet that much danger may arise from a variety of circumstances ; and that wounds may eventually prove mortal which at first were not attended with any obvious risk.

Thus wounds in the lungs, and other viscera, prove sometimes fatal, from continuing to discharge such quantities of blood for a considerable time as at last destroy the patient ; although at first the discharge might not appear to be of much importance. The stomach, and different parts of the alimentary canal may be injured in such a manner as to terminate  
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in death without exhibiting any immediate appearance of danger. The external coat of the aorta has been removed by the point of a small sword; and the wound has been nearly healed when the patient died suddenly from a rupture of the artery: And wounds of the gall-bladder, or of its excretory duct; of the receptaculum chyli; of the thoracic duct, and some other viscera; may for several days afford no suspicion of danger, and yet terminate fatally at last.

Wounds sometimes prove fatal from inflammation spreading to contiguous viscera, which were not at first injured; and wounds, which have at first appeared to be of little or no importance, have at last terminated in the worst manner, merely by mismanagement, either in the application of dressings or bandages, or in the conduct of the patient with respect to food, drink, and exercise; for it is well known, that much mischief has been done by improper dressings, and especially by too tight bandages; and we likewise

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know,

know, that misconduct with respect to food is daily the cause of wounds going wrong, which otherwise would probably have done well.

It thus appears, that a variety of circumstances fall to be considered, to enable us to judge of the probable termination of wounds. In doing this with accuracy, practitioners of experience have frequent opportunities of showing their superiority. This subject ought therefore to be considered as highly important by all who wish to distinguish themselves. A minute knowledge of anatomy, a cool temper, and a steady hand, will enable any practitioner, even with no great experience, to perform many of our most important operations sufficiently well: And accordingly in different hospitals, we daily meet with good operators; but we do not often find surgeons possessed of that knowledge in the prognosis of surgical diseases which might be expected; that attention being seldom bestowed which is necessary to attain it.

## SECTION II.

*Of the Cure of Simple Incised Wounds.*

**I**N the management of wounds, the first object requiring our attention is the hemorrhagy ; more especially when it is profuse. The safety of the patient requires it : The alarm which it gives, not only to bystanders, but to the practitioner himself, renders it necessary. Nor can the real state of a wound be discovered with accuracy till the discharge of blood be checked.

Hemorrhagies are most immediately stopped by pressure applied to that part of the divided artery which is next to the heart : This pressure is made by the tourniquet, when the wound is in any of the extremities \* ; and by the hands of assistants, in wounds of the trunk of the body or of the head.

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\* *Vide* Chap. VI.

In this manner, if the pressure is properly applied, almost any hemorrhagy may be stopped till the wounded vessels can be secured with ligatures ; which we shall hereafter show to be the safest, as it is the easiest method of preventing patients with such injuries from suffering \*. Much indeed has been said, even of late years, of the inconveniencies which ligatures are supposed to induce : But this has proceeded either from the interested views of some individuals who may have wished to establish the reputation of different styptics ; or from the groundless fears of young practitioners. Where the contiguous nerves, or even where much of the surrounding muscular parts, are included in ligatures, severe pain, and other troublesome symptoms, will no doubt be induced ; but this is not the fault of the remedy, but of the method of using it. Indeed this is so obviously the case, that reasoning in the farther support of it does not seem to be necessary ;

\* *Vide* Chap. VI.

necessary ; for every practitioner of experience will admit, that a proper application of ligatures is seldom if ever productive of any material inconvenience, and that we can depend on it with more certainty than on any other remedy for putting a stop to hemorrhagies from wounded arteries.

In the preceding editions of this work, when treating of the method of applying ligatures to arteries, I gave it clearly as my opinion, that it may be best done by the tenaculum, an instrument represented in Plate V. fig I. And after much additional experience of its utility, I now think it right to say, that I am more and more convinced of its being much superior to the needle ; which cannot be used without a portion of the contiguous soft parts being included in the ligature ; a circumstance which in every instance we should endeavour to avoid. Many imagine that the tenaculum may be used with safety in securing arteries of a middling size, while they are afraid of cutting those of a small



size asunder, if some of the contiguous cellular substance be not included along with them: And in tying the large trunks of arteries, they suspect that the ligatures would be apt to be forced off by the strong pulsations of these vessels, if they were not supported by being firmly fixed in the contiguous parts. I have not, however, had a single instance of observing that either of these objections to this practice is well founded. For a number of years past, I have laid aside the needle, for the purpose of applying ligatures to arteries, almost entirely; and in the course of that time, I have employed the tenaculum indiscriminately in hemorrhagies from arteries of all sizes.

Wounded arteries are seldom so situated as to prevent the hemorrhage from being stopped in the manner we have mentioned: For when they lie at the bottom of deep wounds, with narrow contracted mouths, the wound may commonly be enlarged so as to admit of their being tied with ligatures; and for the most  
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part it may be done with safety. Where the enlargement of a wound is not clearly necessary, no person of experience would advise it; but the practice is always safe and proper in hemorrhagies proceeding from arteries lying so deep that ligatures cannot otherwise be applied to them. As this practice, however has been very inadvertently condemned by some practitioners in every instance, from their supposing it to be rarely if ever necessary, a timidity has been thereby introduced, which, in various instances, has been the cause of mischief: Patients have been tormented with the application of tight bandages, and with the trial of different styptics, which seldom if ever succeed, when the hemorrhagy might have been stopped in the most effectual manner by a small enlargement of the wound: Nay, many limbs have been amputated from the same cause, which might easily have been saved; particularly in cases of compound fracture, where a hemorrhagy, proceeding  
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from a deep-seated artery which cannot be easily tied, is too frequently considered as a sufficient reason for removing the limb. From particular circumstances, in a few cases of compound fracture, it may happen that hemorrhagies cannot be stopped without laying the injured parts so extensively open, as might induce more hazard than amputation itself. This, however, is a very rare occurrence; and it will seldom take place where the case has been properly treated from the beginning.

When the injured artery runs in the substance of a bone, no ligature, it is evident, can be applied to it; and therefore, in such a case, enlarging the wound could not be attended with much advantage. But arteries in this situation are never so large as to lead us to be much afraid of any hemorrhagies that may proceed from them; nor does it often happen that they continue to bleed long after they have been completely divided. An artery thus situated, being merely wounded,

wounded may discharge a great deal of blood ; but I have met with different instances of the hemorrhagy stopping almost immediately on the vessel being cut across. Authors indeed have said, that the utmost danger has been induced by arteries surrounded with bone being wounded ; nay, that death itself has happened from this cause, owing to the impossibility of including them in ligatures. I am convinced, however, that it is a partial division only of such arteries that will ever produce hemorrhagies of any importance ; for they are always small, and they never adhere so firmly to the surrounding bone, as to be prevented from contracting on being freely divided.

Where the discharge of blood proceeds from large vessels, the means we have mentioned are the most effectual for putting a stop to it. But when it occurs from an infinite number of small arteries over the whole surface of a wound, other remedies must be employed. We must here refer, however, to a subsequent chapter

chapter of this work, where this subject will fall more properly to be fully considered \*.

The hemorrhagy being stopped, the next object requiring our attention is the removal of any extraneous body that may have been admitted: And where such substances are not deeply seated, this is always done both with most ease and safety with the fingers alone; for when forceps and other instruments are employed, we can scarcely fail to injure the contiguous parts.

The examination of wounds, with a view to discover extraneous bodies, ought to be made with much delicacy; for handling the parts roughly gives unnecessary pain, and is besides apt to induce a degree of inflammation, which often proves hazardous.

But although it is always proper to accomplish the removal of extraneous bodies with as little pain to the patient as possible; yet wherever we have any certainty

\* *Vide* Chap. VI.



tainty of bodies of this kind being lodged, we ought by all means to proceed with firmness, in the first place, in discovering their situation, and afterwards in removing them, excepting in a few particular cases where this cannot be done without much risk of injuring parts of real importance to life. In such cases the judgment of the practitioner must decide between the danger that may probably ensue from the extraneous body being allowed to remain, and that which might arise from his proceeding to remove it immediately.

Modern authors in general strictly forbid much assiduity in the removal of bodies of this kind: For they very properly observe, that in former times much mischief was done by exploring wounds with more exactness than was requisite; by which unnecessary pain was induced, and cures thus rendered more tedious than they otherwise would have been.

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But in this matter the moderns seem to have gone from one extreme to another : For although much handling of sores, and a free use of probes, forceps, and other instruments, is seldom necessary, it is equally true, that by allowing extraneous bodies, which might have been removed at first, to remain in wounds, much future pain and inflammation have been occasioned.

In support of the practice we are told, that various cases are on record of extraneous bodies continuing to lodge in different parts of the body without any inconvenience ; that this will commonly happen when the substance is not of a stimulating nature ; and when it is of such a form or texture as to induce pain, that it will soon excite such a plentiful suppuration as will quickly throw it out in a much more easy manner than if it had been removed at first. In answer to this, I shall observe, that where extraneous bodies in wounds cannot be removed without giving the patient a great deal of pain ;  
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and especially where there is any risk in doing so of large contiguous blood-vessels being wounded ; we ought by no means to make the attempt. In such cases we ought certainly to trust to the subsequent suppuration for throwing them out : But they ought always to be taken out immediately, when it can be done with tolerable ease, or without injuring any parts of importance. In this way a more expeditious cure is obtained, and we accomplish our purpose in an easier manner, than could be done in any future stage of the sore. For in a recent wound, while no inflammation or tension takes place, the contiguous parts easily stretch and yield to the extraction of any substance that may be lodged in them; if it be not of an angular form, and if the operation, instead of being performed quickly, be done with slowness and caution : Whereas, when the contiguous parts become stiff and painful, which they always do in the course of a short time, any substance lodged in them is removed with much pain and difficulty :

ty : For even after a free suppuration has taken place, although the parts will be considerably relaxed, yet still they will be more stiff and tense than they were at first ; and the opening through which the substance is to be extracted will likewise be diminished.

Another very material advantage is gained by the immediate removal of extraneous bodies from wounds. While a fore is recent, patients, for the most part, will allow every thing to be done which the practitioner in attendance may think necessary ; while they frequently refuse, in future stages of the fore, to submit to any thing besides the usual dressings.

It may be remarked in this place, that of the extraneous bodies that are apt to be lodged in wounds, some are more harmless than others. A prudent practitioner will therefore be more or less anxious in attempting to remove them. Thus we all know, that a lead-ball may be lodged very deeply for a great length of time, without being productive either of pain or inconvenience ;

convenience; while a splinter of wood, glass, or iron, or even a bit of cloth, will often create a great degree of uneasiness. When, therefore, it is known that a lead-ball is the only substance that is lodged, if it cannot be easily removed, we have at least the satisfaction of being assured that it will not probably do much harm. We will therefore allow it to remain, either till it is loosened by a plentiful suppuration, or till some future period, when it may perhaps be discovered in a different situation, so as to be taken out with safety at a counter-opening: While, on the other hand, when such substances are lodged in wounds as will probably excite much irritation and pain, it will be much for the interest of the patient, and will be the means of preventing much perplexity and trouble to the surgeon, to have them removed as soon as possible after the injury is inflicted.

We have observed above, that in removing extraneous bodies from wounds, it should be done with the fingers alone,



rather than with forceps. Some few exceptions may occur to this, which we shall afterwards have occasion to mention. But substances are sometimes lodged in wounds that cannot be easily taken out either with the fingers or forceps. This is particularly the case with sand, dust, and small pieces of glass. These are best removed by bathing the parts in warm water, or by pouring warm water upon them; squeezing the water gently from a sponge, or injecting it slowly with a syringe.

In performing even this very simple operation of washing a wound, as well as in extracting foreign substances with the forceps, or in any other way, it is proper to observe, that much advantage may be derived from placing the patient in such a posture as tends most effectually to relax the injured parts, so as to obtain as wide a separation as possible of the lips of the wound. I have seen different instances, where, from want of attention to this circumstance, patients have suffered much unnecessary

unnecessary pain; where, after various trials, the practitioner has been obliged to desist without accomplishing his object; and where another practitioner has proved at once successful, merely by putting the wounded parts in a relaxed position.

After paying due attention to these circumstances respecting extraneous bodies lodged in wounds, our next object is the conduct of the cure.

In incised wounds, a separation occurs of the parts that have been divided; and as every wound proves a cause of irritation, the separation which takes place at first continues for some time to increase, merely by the contractile power of the injured muscles. In the usual way of covering wounds with lint, or with pledgits of ointments, and where the parts have not been previously drawn together and retained in their situation, an effusion of a serous fluid soon takes place into the cavity of the sore, from the small vessels that have been cut. This is afterwards

converted into purulent matter: In a short space of time the parts are found to be covered with an infinite number of small sprouts or granulations; and these having advanced to a certain extent, a dry pellicle of scarf-skin, termed a Cicatrix, forms over the whole extent of the wound, and thus the cure is completed.

In this manner the healing of wounds is effected, when nature is not assisted by art, or when her operations are only promoted by proper coverings, and protection merely given to such parts as are injured. But although, in some cases, this is our only resource; and although even in this way practitioners have it always in their power to forward the cure of sores; yet it is liable to many very important objections, which may be obviated by a different treatment.

When a wound is healed in this manner, if the divided parts have separated to any considerable extent, the suppuration which ensues will be plentiful; by which, if the constitution is weak, the patient is  
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apt to be materially injured. In extensive sores, this method of cure is always tedious ; when deep muscular parts are injured, the motion of the contiguous joints is apt to be affected ; and the cicatrix of a large wound, when cured in this manner, is always stiff, unseemly, and disagreeable ; nor is it possessed of that strength and firmness which the parts beneath require for their protection.

Patients, however, are seldom under the disagreeable necessity of submitting to these inconveniencies : For in general, wounds may be cured in a more easy as well as in a more agreeable manner : We know from experience, that two inflamed surfaces of an animal body, when kept in contact, will soon adhere together. This was probably at first pointed out by accident ; but practitioners now derive much advantage from the knowledge of it, not merely in the management of wounds, but in a variety of important operations : By drawing such parts as have been divided into contact with each other ; and

taking care to have them all as completely covered as possible with the cutis vera, very extensive wounds are, in this manner, often quickly cured; the power of moving and of using limbs with freedom is often preserved which otherwise would be lost; the scar or mark which remains is seldom of any importance; and the wounded parts have the advantage of being sufficiently protected.

It has long been known that parts recently divided will unite together, if kept in contact for a sufficient length of time. The cause, however, of this phenomenon has not hitherto been clearly explained: The prevailing idea is, that it proceeds from a direct inosculation or junction of the different parts that have been divided; and that those parts only will adhere together which were formerly united. Thus it is imagined in the healing of wounds in this manner, that a divided artery on one side of a cut must be made to adhere directly with its fellow on the opposite side; that  
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veins must unite with veins ; muscular fibres with fibres of a similar nature, &c. But although it is necessary in practice to keep this idea so far in view, as to place parts that are to be healed as exactly opposite to each other as possible ; yet this proceeds more from a requisite attention to symmetry and neatness after the cure is performed, than from any other cause : For it is certain, that no such exactness is required for the mere adhesion of the divided parts, and whoever doubts of the fact may with little difficulty prove it experimentally. A membrane may be made to adhere to a bone ; and the divided end of an artery or a vein will unite with almost any substance with which it is kept in contact.

It is indeed true, that blood circulates through the cicatrix of a wound ; a fact which few will doubt, and which probably gave rise to the opinion we are now considering. But we have reason to believe that this circulation does not take

place immediately on the formation of a cicatrix. It seems rather to be an after process of nature, and is evidently accomplished by an infinite number of small vascular sprouts or newly created blood-vessels, which proceed from the larger arteries and veins on each side of the wound, and inosculate with each other, so as to form a sufficient circulation in the parts through which they pass. At least I have found, in different instances, on examining the cicatrix of a large wound, that it was always very vascular; and I conclude that it happens from a new formation of small blood-vessels, as the divided extremity of every blood-vessel, whether artery or vein, when of such a size as to be easily distinguished, is always shut, and even obliterated for a certain space from the point where the injury happened, in the same manner as in arteries that are tied with ligatures in cases of amputation and other capital operations. And if this happens in vessels of a large size, there is reason

son to suppose that it does so in those that are smaller.

In confirmation of this opinion, we may observe, that a circulation of blood betwixt adhering surfaces, takes place where inosculation of the kind in question can never occur, from no previous division of blood-vessels having been made. Thus, when the skin of two contiguous fingers or toes becomes raw or tender, without any blood-vessels being injured, it is difficult to prevent them from adhering; and when they do adhere, a free circulation is afterwards found to take place between them. Other instances might be adduced; but I notice this one, as it is not unfrequent, and as it is perfectly applicable to the present question.

I therefore conclude, that wounds cured in this way, are healed in the same manner as adhesion is produced between inflamed surfaces, namely, by exudation of the glutinous part of the blood from the extremities of the divided vessels; which

which in the first place retains the parts together, and afterwards serves to support the new formation of small blood-vessels, which nature puts forth as a farther and more certain means of retention.

I have entered into this physiological discussion, imagining that it tends to establish a material point in practice. It has commonly been supposed, that the space of twelve, fourteen, or fifteen days, is necessary for the complete adhesion of divided parts: A supposition which proceeds upon the idea that this adhesion is formed solely by the inosculation of blood-vessels. But if agglutination alone is necessary, in the first instance, to accomplish this adhesion, it is evident that it may be effected sooner. Accordingly, I have uniformly found divided parts adhering firmly about the fifth day: Nay I have known the bandages accidentally removed from wounds on the second and third days, without any separation of the parts newly united. being  
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the consequence. From this it appears, that a shorter application of the usual means of retention will answer than is commonly practised. Surgeons term this treatment of sores, Healing by the First Intention; and as it is in every respect the most desirable method of cure, it should always be followed when practicable.

In some varieties of wounds, different reasons occur to prevent us from curing them in this manner. These we shall afterwards have occasion to mention. But in the simple incised wound, where the injury has been inflicted with a clean-cutting instrument, without producing puncture, laceration, or contusion, the only objection that can occur to it, is our not being able to draw the divided parts into contact, and to retain them in that situation till they adhere together. This, however, will seldom happen, unless a loss of substance takes place to a considerable degree. Where a large portion of skin, with the muscles beneath, }  
has



has been entirely cut out, it may in some cases be impossible to bring the retracted edges of the wound together ; but we may always make them approach so as to diminish the size of the sore, and may thus have it in our power in every instance to forward the cure. In deep transverse wounds, even where no substance is lost, the retraction is often so great, as to render this practice somewhat difficult: But by placing the injured part in that situation which tends most effectually to relax the divided muscles, we may effect our purpose almost in every instance. It is indeed surprising to see how completely divided parts will be made to approach, which, while the muscles were upon the stretch, were separated to a considerable distance from each other. We should never therefore despair too soon ; for even in the worst cases we seldom fail, by due perseverance in this mode of treatment, to obtain some very essential advantage.

When

When it is found that the divided parts may be drawn together, we have next to fix upon the best and easiest method of retaining them in this situation during the cure. Various means are proposed for this; namely bandages of different kinds, adhesive plasters, and sutures.

The sides of longitudinal wounds, in any of the extremities, and of some wounds of the head, may be retained by the uniting bandage. But this seldom answers in the trunk of the body; nor can it ever prove useful in wounds, either in the legs or arms, that run transversely: And even where there is reason to think that it will answer sufficiently well for retaining the sides of the wound in contact, we ought never to trust to it entirely; for we cannot depend upon a bandage alone for preserving the skin smooth and equal; a circumstance of much importance in the cure.

The easiest method of retaining the skin exactly in its situation, is by means  
of

of adhesive plasters applied in the manner represented in Plate I. In some cases plasters alone prove sufficient ; but when much retraction is expected, the uniting bandage should be applied over them whenever the direction of the wound renders it admissible.

Many practitioners, in all cases of wounds, prefer adhesive plasters to the use of futures ; but it is in particular instances only that this preference is proper. Adhesive plasters may be used with advantage in superficial wounds that do not penetrate much deeper than the cellular membrane ; and where there is a loss of substance, to such an extent as to prevent the sides of a wound from being drawn close together, they may be employed for the purpose of retaining the retracted parts as near as possible to each other. But in all wounds that penetrate to any considerable depth, and when their edges can be drawn into contact, the twisted future is by much the best for retaining them. For a description  
tion

tion of this and other futures, we must refer to Chapter V. The common interrupted future is indeed more frequently employed than the other; but it does not support the parts with such certainty; the ligatures are more apt to tear or cut out the parts which they surround; and they frequently leave disagreeable marks.

It is a common opinion, we may remark, that adhesive plaisters and futures are admissible only in the recent state of wounds. But however desirable it may be, for various reasons, to have the application of either of them made as early as possible; yet when neglected at first, they may be employed with advantage during any stage of the sore: For we are wrong in supposing, as is commonly done, that wounded parts will not adhere when in a state of purulency. I have repeatedly treated in this manner, sores of two, three, and four weeks duration, and very commonly with advantage: Insomuch, that I believe the practice

tice will generally succeed in every stage of a sore when the retracted edges can be brought together.

Whether we employ adhesive plasters or futures, we should be very attentive in supporting the parts, as far as it can be done, by the posture of the patient; for if this is neglected, futures of every kind will yield so as not to answer the purpose: And along with this, when plasters are used, a farther advantage, as we have already observed, may be derived from a proper application of the uniting bandage; but for the reasons given in the chapter on Sutures, a point that will also be farther taken notice of, when treating of the Hare-lip in Chap. XXXIII. neither this nor any other bandage can with propriety be employed along with the twisted future.

When a wound is treated in this manner, as soon as the retracted edges are drawn together and properly supported by plasters or futures, no other dressings are necessary, excepting a thin covering  
of



of soft lint to protect the parts beneath from cold; and with a view to prevent as much as possible any access to air, the lint should be spread either with some unctuous substance, or with mucilage of Gum Arabic, or any other inoffensive gum.

This being done, the patient should be desired to preserve the injured parts in the most favourable posture; and care should be taken to enjoin a well-regulated diet. If he is low and emaciated, he may with propriety have a small allowance of animal food; but when plethoric, or liable to inflammatory affections, and the wound extensive, a strict antiphlogistic course is requisite: For although inflammation to a certain extent may be necessary for the cure of wounds; yet a prudent practitioner will always guard against excess of inflammation, as productive of much mischief.

In open wounds, the most effectual application for removing extreme degrees of inflammation, is warm emollient cataplasms; but as they tend to induce the

formation of matter, and as this is directly opposite to our views in the mode of cure we are now considering, it is evident in such circumstances that they are inapplicable. But although warm emollients cannot with propriety be employed; yet much advantage may be derived from a proper use of any cold emollient oil or unguent. When the attending symptoms of pain and inflammation are moderate, the dressings should never be removed till the cure is completed; but whenever the pain becomes severe, as it would probably, if neglected, terminate in some high degree of inflammation, by which our intention might be frustrated, the dressings should be immediately taken away, so as to admit of the pained parts being gently rubbed or even bathed with an emollient. By this being repeated from time to time, I have seen different instances of very distressful degrees of pain being alleviated, and of the contiguous parts being so much relaxed, as to admit of the cure by adhesion going on without

without interruption. In some cases, however, we are under the necessity of employing other means; and of these the most effectual are opiates and blood-letting, particularly local blood-letting with leeches; which often proves effectual in removing pain and inflammation, when every other application has been tried in vain.

In general, a continuation of these means will answer the purpose: But it sometimes happens, notwithstanding all our endeavours, that the pain and inflammation increase, and the tension of the wounded parts becoming more considerable, the plasters and ligatures with which they have been kept together must be taken away, otherwise they will do mischief. In such circumstances the ligatures should be removed at once; and for the most part this will give the patient immediate relief: The pain and tension will soon disappear; and a cure must be accomplished in the ordinary way, as it

might prove hazardous to attempt the same method of treatment again.

I think it right, however, to remark, that, in general, the cure goes on without any interruption of this kind; and where this is the case, our views are completed as soon as a firm adhesion has taken place between the edges of the wound. I have already remarked, that this process is commonly accomplished in a shorter time than is usually imagined. In superficial wounds, the ligatures, or other means of retention, may be removed sooner; but even in deep extensive wounds, if the habit of body is sound, they may with safety be taken away on the fifth or sixth day. By this time every advantage that can be derived from them will be gained; while much inconvenience, and some mischief, might arise from their being allowed to remain longer.

I have already mentioned many of the advantages which result from this method of curing wounds. They are indeed so important, that we should seldom  
hesitate

hesitate to put it in practice: For even when it fails, we know that any troublesome symptom which it may induce, will be removed by due attention to the means above mentioned; while much time will be gained when it succeeds. Two objections are commonly made to it, which we shall shortly consider. It is said, that the ligatures with which it is often necessary in wounds to secure the arteries, will act as extraneous bodies, and prevent the sides of the wound from uniting. And it is likewise observed, that in the course of the cure matter is apt to form, from the lodging of which, troublesome sinuses are produced. Neither of these objections, however, are well founded; at least, I have never met with a single instance of their being so. It seldom happens that more than one or two arteries in any wound require to be tied: But I know from experience, that wounds may be cured by drawing their edges together, even where a considerable number of arteries have been secured with ligatures: For



the threads occupy very little space, and when applied with the tenaculum, which ought always to be done, they are easily removed without any disturbance being given to the rest of the wound. And again, with respect to sinuses being apt to form from this method of treatment, if the edges of a wound are only drawn together above, a cavity will thus be formed beneath, where matter will no doubt be apt to lodge; but this should not be attributed to the method of cure, but to the mode of putting it in practice: For in every wound treated in this manner, the whole of the sides or edges should be drawn together from the surface to the bottom, by which the formation of sinuses is effectually prevented.

We have now to speak of those wounds which do not admit of this mode of treatment. When the edges of a cut cannot be drawn together, after the hemorrhagy is stopped and extraneous bodies removed, we find by experience, that the most effectual assistance we can afford, is to  
promote

promote as much as possible the formation of matter: For the fact is undoubted, that in every wound of this kind, a free suppuration proves the most effectual relief to every symptom; at the same time that it appears to be so materially connected with the cure, that the healing process never begins till the sore is covered with good pus; a circumstance by no means difficult to account for. The cure of sores healed in this manner, is so far effected by nature alone, that although some advantage may be derived from art, yet our chief object ought to be the removal of such impediments as might tend to obstruct the operations of nature, and to protect the injured parts till the cicatrix becomes sufficiently firm. Now, as we know that granulations do not readily form in sores as long as they remain painful; and as nothing with which we are acquainted proves so mild an application to wounds as pus, we may conclude, that it proves chiefly useful by preserving the injured parts in that easy, pleasant state,

which seems to be indispensably necessary for the cure. It should therefore be our first object, in the treatment of sores of this description, to forward the formation of pus as quickly as possible ; and the most effectual method of doing it is, by treating every wound in the same manner as we do a common phlegmon ; that is, by a free use of warm emollient poultices and fomentations.

In the first place, the parts should be immediately covered as completely as possible, so that they may be protected effectually from the admission of air. When the pain is excessive, poultices may be directly applied, as being the surest means of relieving it. But, when the pain is moderate, it is better to delay the use of emollients for a day or two ; for as pus cannot be produced till a serous effusion has taken place, and as we know that some degree of inflammation is required for effecting this, when the pain and tension in wounds are inconsiderable, an immediate application of poultices is apt to do harm,

harm, either by preventing altogether, or by retarding and rendering too languid that inflammatory affection which appears to be necessary for the cure. But in every instance of wounds of considerable extent, remedies of this kind prove always useful after the first two or three days have elapsed: For by this time a sufficient degree of inflammation has commonly taken place for effecting the wished-for effusion; and we have elsewhere had various opportunities of showing, that in no other way can this be so readily converted into purulent matter as by a free application of heat\*; so that whenever this remedy is advised, it should be used to the same extent as in cases of phlegmon.

It is proper, however, to remark, that this remedy should be used with caution. For although heat, whether conveyed by means of poultices or fomentations, is perhaps the most useful application in the stage of wound we are now considering;

\* See Chap. I.

dering ; yet when long continued, it is very apt to do mischief, as we have daily opportunities of observing, where it is employed by those who do not consider upon what principles it acts in the cure. When the purpose we have mentioned is gained, namely, a free and kindly suppuration, as it is for this only that poultices are used, they should then be laid aside: For when continued longer, they almost constantly do harm, by relaxing the parts to which they are applied too much ; by which they are apt to become pale, soft, and spongy, instead of being of a healthy red colour, and of a firm texture. Nay, they are at last often productive of the very contrary effect for which they are employed : For although much inflammation proves hurtful in the cure of wounds, yet in some degree it is always necessary. Now, by continuing the use of warm emollients too long, this salutary degree of inflammation is so entirely carried off, that the matter becomes thin and in too great quantity. And thus  
troublesome



troublesome vitiated fores are produced, which a different management would probably have prevented.

The period at which the use of poultices and other warm applications should be laid aside, must be determined in every case by the judgment of the practitioner. This general rule, however, may be safely adopted, that they may at all times be persisted in as long as much pain and inflammation continue; but these symptoms becoming moderate, the discharge being good, and the surface of the wound covered with granulations of a healthy appearance, they should now be laid aside. In this state of a fore, all the advantages are gained which poultices can produce; and when long continued, some of the inconveniences I have mentioned are very apt to ensue.

In the ensuing chapter, I shall have occasion to enter upon a more particular detail of the best dressings for wounds. It will  
not,

not, therefore, be necessary, at present, to speak minutely upon this part of our subject.

I have already had occasion to remark, that a certain degree of inflammation is required for the cure of every sore ; but as this very rarely proves deficient, and as we have more to dread from this symptom proceeding too far, especially in the first stages of large wounds, the mildest dressings only should be employed. During the progress of the cure, much advantage indeed may sometimes be derived from the application of dressings of an irritating, or even of an escharotic nature. This, however, is only the case when a wound has advanced to the state of an ulcer. While yet recent, the mildest application is always the best. In this country, soft dry lint is commonly employed, while some practitioners advise pieces of soft sponge ; and it must be admitted, that they answer much better than any of the irritating balsams which till of late were very universally used, and which in most  
parts

parts of Europe are still continued: For it was in Britain that mild dressings to wounds were first introduced; and it is in this country only where even yet they have been generally received. But although dry lint is a mild application when compared with many others, it always creates pain and irritation on being first applied, besides being apt to adhere to the edges of wounds, so as to be with difficulty removed. With a view to prevent these inconveniencies, the lint should be thinly spread with any mild ointment; such as Goulard's cerate, or common wax ointment. By this means it gives no pain in the application, while it is removed with ease, at the same time that it serves more effectually than dry materials to prevent the air from finding access to the sore. As dry lint, however, has long been generally employed in this country, any innovation will not be readily admitted; but what I have advised, being the result of a good deal of experience,

rience, I can with confidence recommend it.

A piece of soft lint, spread with any ointment of this kind, being laid over the wound, a bolster of fine tow should be applied above it for the purpose of keeping the parts warm, as well as for absorbing any matter that may be discharged; and this being covered with a compress of old soft linen, the whole should be retained by a bandage of fine flannel or cotton, which is preferable to linen, in so far as it is commonly more agreeable to the feelings of the patient, and as it yields to any accidental swelling or tumefaction of the neighbouring parts: Whereas linen, possessing little or no elasticity, is very apt to do mischief, by remaining stiff and immoveable, notwithstanding any swelling that may ensue.

Practitioners are not agreed upon the time at which the first dressings of sores should be removed; and nothing decisive can be said upon it, as in some measure

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it must be directed by the circumstances of every case. This general rule, however, may be properly adopted, that a sore should always be dressed when plentifully covered with matter. This will generally be the case about the fourth or fifth day ; but as the formation of pus depends upon different circumstances, particularly upon the health of the patient, and on the degree of heat in which the parts are kept, some latitude must be allowed in it. A free use of poultices, after the second day, puts it in our power to remove the dressings much sooner than we otherwise could do : For they not only promote the formation of matter, but soften all the coverings that have been used, so as to admit of their being easily taken away.

When the cure of a wound goes on without interruption, the second, as well as the subsequent dressings, should be precisely the same as the first : For our object being still the same, no variation, it is evident, can be necessary. As nothing



thing proves more hurtful to sores than exposure to the air, one great object in the application of dressings, is to prevent any inconvenience which might arise from this. And the same reason renders it necessary to change the dressings as seldom as is consistent with cleanliness; and to be as expeditious as possible in renewing them. In general, however, no harm will occur from the daily dressing of wounds. They should not, but in very particular circumstances, be dressed more frequently; nor can it often be proper to dress them seldomer than this: For when matter is allowed to lodge long, the heat in which patients with large wounds are usually kept, is apt to render it putrid and offensive. But as I shall elsewhere have occasion to speak fully upon this subject, it is not at present necessary to consider it more particularly\*: I shall just observe farther, with respect to the continuance of mild dressings to wounds, that

\* *Vide* Chapter IV.

that it ought to be regulated by the progress of the cure. As long as the cure continues to advance, mild dressings should be continued; but when the sore assumes any vitiated or morbid appearance, some variety in the dressings becomes necessary; and the nature of any change to be thus adopted must be regulated by the situation of the sore at the time. We must refer, however, for a more minute consideration of this part of our subject to the different sections of the ensuing chapter.

I have hitherto been supposing that none of the symptoms are violent; in which case the cure will, for the most part, go easily on, under the mode of management I have mentioned. But in some cases the healing of the sore is not only much interrupted, but much hazard is induced by the unusual height to which some of the symptoms proceed; and these particularly are, pain, inflammation, and convulsive affections of the muscles. I shall therefore offer a few observations

upon the means of obviating these symptoms, when they proceed to such a height as to prove hazardous.

A wound cannot be inflicted without inducing pain : For even the slightest injury must necessarily affect some of the smaller branches of nerves ; by which pain, to a certain degree, will be induced.

It commonly happens, however, that the pain which at first takes place in wounds is not so severe as to require any particular management : And in general, it subsides entirely upon the removal of any extraneous bodies which have been introduced ; by protecting the injured parts with proper coverings ; and by a plentiful formation of matter. But in a few cases the pain continues severe after every usual method of removing it has been attempted. Opiates in large doses are in such circumstances more to be depended on than any other remedy ; and they do not often fail of giving relief. But it frequently happens that their effect is only temporary,

temporary, the pain being apt to recur after the strength of the opiate is exhausted.

In this event we are to search with much care for the cause of the pain. It may proceed from some particles of extraneous matter which have not been discovered ; from inflammation of the wounded parts ; or from some portion of a nerve or tendon being partially wounded without being divided ; or from irritation over the whole surface of the fore.

We should therefore, in the first place, examine the wound with attention, so as to be as certain as possible that no extraneous matter has found access ; for when pain proceeds from any foreign body lodged in a wound, the removal of this will, for the most part, procure relief ; while no other remedy will have any effect as long as it is allowed to remain. When not readily discovered, or when the particles of any extraneous matter that may be lodged in a wound are so small that they cannot be removed with the fingers, we have already advised the injecting of warm wa-

ter, by which they will often be washed out when every other trial has failed. But when this does not succeed, it sometimes answers to immerse the wound for a considerable time, perhaps for an hour, morning and evening, in warm water, or in warm milk ; by which particles of matter are sometimes dissolved and carried out, which would otherwise have continued to give much uneasiness.

If no trial, however, that may be made for this purpose, should prove successful, we must look for some other cause of the pain ; and it will often be found to originate from inflammation. When the external parts of a wound are inflamed, this cause of pain is at once rendered obvious ; for even the slightest degree of inflammation is very readily discovered. But it sometimes happens that the periosteum, and other deep-seated parts, are affected in this manner, without any external marks of it appearing. This, however, is only the case for some short period after the inflammation has commenced :



commenced : For even when it first attacks parts that are deeply seated, it commonly spreads in the course of a day or two, so as to be discovered outwardly ; and when this does not happen, we may in general be directed to the cause, by the heat of the patient's body ; by the state of his pulse ; and by the degree of thirst, which in cases of this kind is always increased.

When these symptoms of fever run high, it is sometimes necessary to take away considerable quantities of blood by one or more general blood-lettings. But for the most part this measure is not necessary, and our views are obtained with more certainty by local blood-letting near the edges of the wound by means of leeches. In such circumstances, indeed, no remedy proves so successful as the discharge of blood in this manner. I have long been in the practice of using it in wounds accompanied with much inflammation, and very commonly with much advantage. In cases of pain proceeding from this cause,

I have known the application of a few leeches to the edges of a wound procure immediate relief, even where large doses of opiates, as well as other remedies, had previously been tried in vain. And that it is not the quantity of blood, but the manner of discharging it, which proves successful, is evident from this, that the pain is often relieved immediately on a few drops being taken with leeches, which did not yield in any degree to the loss of a considerable quantity by venesection. In using leeches for this purpose, they should be applied as near as possible to the edges of the wound; nay, when they will fix within the wound itself, the practice proves still more successful: But unless the inflammation is deeply seated, this measure is seldom necessary. It sometimes happens, however, as we have observed above, that in deep wounds no inflammation of any importance appears externally, while the periosteum and other deep-seated parts are much inflamed and painful. In this situation,  
nothing

nothing affords so much relief as scarifications made in the inflamed parts, either with the shoulder of a lancet or the point of a scalpel. Nor need we hesitate to advise them under the dread of their being apt to produce exfoliations of the bone beneath. Instead of this, they tend more certainly than any other remedy to prevent them; for exfoliations seldom happen from the periosteum being merely divided; of which we have daily instances in wounds penetrating to this depth, which are rarely attended with this effect, unless the bone itself is at the same time injured. In different cases I have scarified the periosteum and other parts deeply seated in wounds, and always with advantage. It removes pain and tension in the most effectual manner, and thus tends more effectually than any other remedy to relieve the most distressful symptoms which wounds ever excite.

After as much blood is discharged as may be judged proper, whether by leeches or scarifications, no application will

prove so useful as warm emollient poultices and fomentations frequently renewed : For in such circumstances nothing affords such effectual relief as a plentiful suppuration being induced. We constantly observe, that as long as a wound remains dry on the surface, the parts are tense, much inflamed, and very painful ; and that they become lax and easy as soon as they are properly covered with purulent matter.

For the most part, the means we have mentioned will be attended with the desired effect ; and especially if the operator is not too timid in making the scarifications : For I must again observe, that this may be done with much more safety and freedom than is commonly imagined ; and when membranes in any situation are much inflamed, nothing with which we are acquainted will so certainly prevent the accession of gangrene as deep and free scarifications. Even this remedy, however, will not always succeed : For in some cases the inflammation,

tion, instead of abating, becomes more and more violent, till at last it terminates in mortification.

When wounds are attended with violent pain, proceeding from inflammation, the cause, as I have observed above, is for the most part readily perceived. But severe pain is sometimes induced by other causes : For although much pain seldom fails to induce an inflamed state of a wound at last, it often subsists for a considerable time before this takes place. In such cases, and especially where we have no cause to suspect that the pain arises from the lodgment of matter, it will often be found to proceed from the partial division of a nerve or tendon : For we know, that in various instances the most excruciating pain is induced in this manner.

In some cases, the pain produced by this is relieved by putting the injured parts into a state of relaxation ; but, for the most part, the only remedy upon which we can depend is a complete  
division



division of the wounded nerve or tendon : And as this is a means of cure which may at all times be practised without risk, it should never be delayed when the pain is found to proceed from this cause ; and especially when, from its violence, there is reason to suspect that it may induce convulsions and other alarming symptoms. As a free use of the scalpel, however, is necessary, patients in general do not easily submit to this remedy ; nor do we commonly find that practitioners advise it. But I can say from many instances of its beneficial effects, that we ought more frequently to practise it : For it seldom fails to give relief, even in severe degrees of pain ; and I never heard of its proving hurtful. It ought always, however, to be advised as soon as any other means that may be employed have failed : For when violent pain has subsisted so long as to induce any material affection of the convulsive kind, even this remedy will not always remove it. On the parts being freely divided, they should be  
be

be placed in a relaxed posture; and an emollient poultice being laid over them, if the practice proves successful, the patient will soon find himself relieved, and the wound may afterwards be treated in the usual way. But when the operation does not prove successful, as will be the case, when from timidity, or any other cause, it has been long delayed, there will be much cause to suspect that the patient will at last die convulsed, notwithstanding the use of opiates, and every other remedy we can employ.

In some wounds again, the pain, instead of being deeply seated, which it always is when it proceeds from an injury done to a particular nerve or tendon, is found to originate from a peculiar degree of irritability of the nerves on the surface of the fore. The pain, in such instances, is not severe; but it often proceeds to such a height as to excite much uneasiness, by which the patient is apt to be deprived of rest, and the matter discharged from the fore rendered sharp and acrid.

For

For the removal of this, emollient poultices, and other warm applications, are commonly employed; but seldom with any advantage. They often appear indeed to increase the irritability. Large doses of opium afford the most certain relief; and a solution of opium in water, or a weak saturnine solution, are the best external remedies. When of a proper strength, they commonly prove successful.

While speaking of the cause and removal of pain, it was necessary to mention inflammation, with the means best adapted for the cure. We have now to attend to the nature and treatment of some convulsive affections which injuries of this kind sometimes induce.

*Subsultus tendinum*, and other spasmodic affections, are frequent consequences of wounds: They are more particularly apt to ensue from the amputation of limbs, when they often prove the cause of much uneasiness and pain; for the starting which they are apt to produce in  
the

the affected limb, excites a violence of action which muscular parts newly divided are not well fitted to support. And when these are severe, and return frequently, they prevent the dressings from being kept properly applied, at the same time that they are often the cause of hemorrhagies from arteries which have even been tied with ligatures. We ought, therefore, in every instance, to treat this set of symptoms with attention. Indeed the risk of their producing hemorrhagies is so considerable, and the sensations which they excite so distressful, that a prudent practitioner will at all times judge them to be of importance.

As these convulsive twitchings are evidently the effect of irritation produced by the wound, it is obvious that those means are most likely to prove effectual in removing them which are most powerful in procuring ease. Hence much advantage is derived from placing the patient's body, and especially the affected limb, in the easiest posture: Indeed more benefit  
is

is derived from this than we are often aware of. I have known the severest spasms almost instantly removed, by changing the posture of a stump. But when this does not answer, opiates will seldom fail.

It is worthy of observation, in using opium for this purpose, that it answers better to give it in small doses frequently repeated, than in large doses at once. The latter often excite sickness, and even vomiting; and after their effects are over, the spasms are apt to become more severe than they were at first; which seldom happens with opiates in small doses, altho' frequently repeated.

These, however, are not the most alarming symptoms of the convulsive kind which occur from wounds. Tetanus and locked-jaw sometimes proceed from them, particularly in warm climates. Occasionally, indeed, these symptoms originate from other causes, the nature of which we cannot always discover; but when not obviously induced by deep or extensive wounds,



wounds, they may often be traced, by a more minute investigation, to some slight injury done to the surface of the body. Even the slightest scratch, not penetrating to a greater depth than the skin, has been known to induce them.

As we know that severe degrees of pain often excite involuntary contractions of such muscles as have been injured, we would naturally expect that deep and extensive wounds would be frequently attended with this effect. But we do not so readily see how the most violent affections of this kind should be most apt to occur from such wounds as are so slight as scarcely to be noticed, and which never of themselves produced much uneasiness : This, however, certainly happens.

Nor do injuries of greater importance induce these symptoms so readily while they are recent and painful : For they seldom occur in large wounds till the cure is far advanced ; and in some instances, particularly after the amputation of limbs, they are never more apt to appear than  
when

when the cicatrix is nearly completed. At least this has been the case in every instance of locked-jaw that I have met with in this country; and we are told from very certain authority, that the same observation has been made in warm climates \*.

The cause of this may be difficult to explain; but our knowledge of the fact leads to some advantage in practice. We have hitherto been made to suppose, that the locked-jaw, and other convulsive symptoms which sometimes succeed to wounds, are most apt to occur from the violence of pain induced at, or soon after the time of wounds being inflicted; and therefore practitioners have guarded with most assiduity against them while the pain has continued severe. But when it is known that these symptoms seldom or never occur at this period, and that they frequently appear in more advanced stages of wounds, those means of prevention which  
are

\* *Vide* Observations on the Diseases incident to Seamen, by Gilbert Blane, M.D. &c.

are found to prove most effectual, will more readily act with advantage if applied at this time.

Practitioners, therefore, in warm climates, should be particularly attentive to this in the advanced stages of wounds; and the most effectual remedy we can employ on the first appearance of a locked-jaw, is immersing the patient, so as to cover the whole body, in a warm bath. The heat of the bath should be regulated by the feelings of the patient; and he should continue in it as long as he is able to bear it. Water is commonly used for this purpose; but where milk can be procured, it should be preferred: For as the warm bath proves here chiefly useful by its relaxing powers, we have reason to suppose that the oily particles contained in milk render it particularly proper; and the idea appears to be well founded by the beneficial effects which in different instances have resulted from the use of it.

It may often happen, however, that milk cannot be procured in quantities sufficient for this purpose. In such situations, fat broths, or water combined with oil in any other form, may be used instead of it. When one application of a bath proves successful, the use of it need not be continued; but for the most part several repetitions of it are necessary. Nor are we to imagine that warm bathing is a certain remedy. It has frequently indeed proved highly useful, and many cures have been accomplished by it; but we must likewise confess that it has often failed, and that patients are daily carried off in warm climates by the locked-jaw, and other convulsive symptoms, notwithstanding the most ample application of the warm bath, and of every other remedy that has hitherto been employed.

The failure of warm bathing has induced some practitioners to make trial of the cold bath; and in some convulsive affections it has certainly proved useful; particularly in cases of universal tetanus:

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But as yet it has not been so frequently employed as to enable us to judge with precision, whether it will often prove useful or not in the locked-jaw, which we are to consider as the most obstinate as well as the most dangerous symptom of this kind.

At the same time that we persist in the use of warm bathing, other remedies ought not to be neglected; and of these opium is the most certain. It proves useful both as an external application and as an internal medicine. By rubbing the contracted muscles with laudanum, or keeping them covered with extract of opium, or with opium merely softened with spirits or water, the spasm has in some instances been lessened: But the most effectual relief obtained from this remedy is by giving it inwardly; not in large quantities as we have remarked above, but in small doses, frequently repeated. The doses should be such, however, as may effectually allay the pain and uneasiness produced by the disease; but more than this is unnecessary.



When exhibited in large quantities, it seems to do mischief, by inducing that very state of the system it was meant to prevent, namely a great degree of irritability: For as soon as the operation of a large dose of opium is over, we commonly find in all spasmodic affections, that the disease returns with double violence. But this may be easily prevented, by giving such doses as the patient can easily bear, and repeating them at short intervals, in such a manner that the effects of one may not be over before another is given. *Æther* and musk have sometimes been conjoined with opium; but no advantage of importance has been derived from them.

We have mentioned opium as an external application; but the remedies of this kind from which we would expect most advantage are emollients, freely applied over all the contracted parts. The nature of the disease seems strongly to point them out; and experience has, in some instances, shown that they may prove useful,

ful. Emollients of every kind may be employed for this purpose; but animal fats of the softer kinds seem to be the best: For they certainly prove more powerfully relaxing in all cases of contracted muscles than the vegetable oils; at least, in the course of my experience, they have commonly proved to be so. I have elsewhere observed, that a very pure oil of this kind is obtained by boiling recent bones in water; and the fat of all kinds of fowls answers well.

Mercurials have been frequently given in locked-jaw, but when mercury has ever proved useful, it has been in such cases only where it was rubbed upon the contracted parts in the form of an ointment, and where it would probably act with advantage as an emollient.

When a locked-jaw is produced by a wound in any of the extremities, if the disease does not yield to the remedies we have mentioned, it has been proposed to amputate the member; and in various cases this hath been practised. I am sorry,

however, to observe, that we have scarcely an instance of the operation proving effectual: For in this disease, as in almost every spasmodic affection, the effect is apt to remain after the cause is removed. We have therefore no encouragement, from past experience, to put this remedy in practice. Instead of proving useful, it has in several instances rendered the disease evidently worse. The remedies therefore which we have to depend upon, are those we have mentioned above, namely, the warm bath, opiates, and a very free application of emollients.

While we are depending on these for effecting a cure, the patient's strength should be supported by mild nourishment given by the mouth, when this can be done; and by glysters of strong broths, when the jaws are so firmly contracted as to prevent food from being received by the mouth: And we may, by removing a tooth or two, even in cases of this kind, convey food to the stomach; so that wherever the symptoms of locked jaw are observed

observed to be approaching, one or two of the teeth should be taken out, as they cannot be removed but with much more difficulty after the jaws are firmly clinched.

Having thus considered the various circumstances relating to wounds in their most usual form, with the means of cure adapted to each of them, we shall now proceed to mention more particularly some varieties in those affections which point out a different mode of treatment; and these are, punctures, laceration, and contusion.

## SECTION III.

*Of Punctured Wounds.*

**A** WOUND is said to be punctured when it is made with a small pointed instrument; and when the external aperture, instead of being wide and extensive in proportion to the depth, is small and contracted. A wound made by a thrust with a small sword, is of this kind.

Punctured wounds prove, in general, more hazardous than incised wounds of much greater extent; from deep-seated nerves and other parts of importance being more apt to be partially hurt; from extraneous bodies being often carried to a depth from whence they cannot be easily removed; from the discharge which they afford being more apt to lodge; and from the sides of the punctured parts being in many instances with difficulty  
made



made to adhere. These are points of the utmost moment, not only from their being often productive of much distress to patients, but from the embarrassment which they give to practitioners, who are more apt to fail in their treatment of this variety of wound than of any other which falls within their management.

It is obvious, that much of the risk which occurs in these wounds, proceeds from their being so contracted, that free access cannot be got to their full depth: And it is equally evident that this can be obviated only by laying them open. Indeed, this is the idea which, in the treatment of punctured wounds, we should always keep in view, that of converting them, as far as with safety can be done, into incised wounds with wide extensive openings. This, however, is a question about which practitioners are not agreed: Some advise the openings of punctured wounds to be enlarged either with tents or with the scalpel; while others allege that

that this is seldom requisite: And they have also differed with respect to the time at which the dilatation should be made; for while some advise it to be delayed for a few days only, others do not attempt it till every other means have failed.

In the treatment of punctured wounds our views ought to be the same as in cases of sinus. Indeed, this kind of wound is exactly a sinus in a recent state; and by considering it as such, the means of cure that will most likely prove successful, are at once pointed out. In every sinus, our intention is to procure a reunion of the parts which have been divided; but we know from experience that this cannot be effected till a certain degree of inflammation is induced upon them. For this purpose, the introduction of a cord or seton along the course of a sinus has frequently proved successful; and some have, with the same views, employed irritating injections. When by these means the internal surface of the  
sinus

sinus is sufficiently inflamed, the cure is to be completed, by compression applied in such a manner as to keep the parts intended to be united in close contact, till a sufficient degree of adhesion is produced. Now, in the application of this treatment to punctured wounds, it is obvious, that the previous steps which we have mentioned for exciting inflammation, would at first be seldom necessary; for one certain effect of every wound is to induce inflammation over all the parts which have been injured: So that *a priori* we should be led to conclude, that compression alone would in all such cases prove successful: For we know that it seldom fails in other cases of sinus where a due degree of inflammation is induced. But we are deterred, in punctured wounds, from the immediate use of this remedy; at least where they penetrate to any considerable depth, from our uncertainty with respect to extraneous bodies being lodged in them or not, and from the inflammation in this variety of  
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of wound being apt to run too high. In superficial wounds, indeed, where we are certain of being able to extract any extraneous matter, and where the inflammation is for the most part moderate, compression may be employed immediately; and when properly applied, it will not often fail. But for the reasons just mentioned, it can seldom be employed with safety in wounds of much importance.

The practice I have long adopted in punctured wounds is this: When they run in such a direction as to prevent a seton from being carried along their whole course, I lay them open immediately from one extremity to the other, or as far as it can be done with safety, either with a probe-pointed bistoury, or with a scalpel and director: And this being done, the parts are dressed in the manner I have advised above, in cases of simple incised wounds. But when it appears that a seton can with propriety be used, emollient poultices are first applied

plied and continued till a free suppuration is induced, and till there is no cause to fear that the symptoms of inflammation are to proceed too far. A cord is then introduced nearly equal to the size of the opening; and being allowed to remain till there is reason to imagine that any extraneous matter lodged in the wound is discharged, it is then gradually lessened, by taking away a thread or two every three or four days; and when reduced to a third of its original thickness, it is taken out entirely; when the remainder of the cure is for the most part easily effected, by the application of moderate pressure along the course of the wound.

When a punctured wound is laid open at both ends, a cord may be easily introduced by means of a blunt probe, with an eye at the end of it. But when the instrument has not passed through the integuments on the opposite side to which it entered, a counter opening must be made, either by cutting with a scalpel on the



the round end of a blunt probe, or by passing a lancet-pointed needle, covered with a canula, along the sinus, and pushing it out at the opposite side with the seton attached to it.

In either of these ways the cure of such wounds may often be accomplished. But wherever the practice is admissible, I am clearly of opinion, that laying them open immediately after the accident is preferable to the other: For in this manner all extraneous bodies are at once brought into view; hemorrhages are easily restrained; and the pain which sometimes occurs from a partial division of nerves and tendons is directly obviated. Nor is the inflammation, which often succeeds to punctured wounds, apt to run so high, when they are treated in this manner, as it usually does when any other method of cure is adopted: So that much distress would be prevented, and a good deal of time saved, if this method of cure was more generally practised. To those not much accustomed to this kind of business,

business, the enlarging of a small puncture, so as to form an extensive wound, appears to be unnecessary and cruel: But whoever has seen much of this branch of practice, will know, that the greatest distress often arises from the smallest punctures; that surgeons are often baffled, and much disappointed in their treatment of them; and he will soon find, that nothing so effectually obviates this as the practice I have advised, of laying the punctures freely open as soon as possible after they are inflicted. Indeed the sooner it is done the better. No advantage can accrue from delay; and a patient always submits to the operation most readily at first, while at the same time it is productive of less pain than when the parts are swelled and inflamed, which they commonly are in the course of a few days from the time of such injuries being inflicted. In every wound therefore of this description, particularly in those received in duels with small swords, and in battles with the points of bayonets,

bayonets, the enlargement should take place even before the parties are carried from the field ; by which many inconveniencies which usually attend these injuries would be prevented.

Some cases, however, occur, in which this practice cannot with propriety be adopted ; particularly where punctures run deep among the large muscles, or contiguous to large blood-vessels and nerves. As more danger would accrue from wounding these than could probably be compensated by any advantage gained by dilating the wounds, it is better in such circumstances to rest satisfied with laying the parts open as far as it can be done with safety ; to trust to the suppuration which will ensue for bringing off any extraneous matter that may be lodged in the wound ; and to a proper application of pressure for completing the cure. Or the practice we have mentioned above, of introducing a seton, may be attempted ; for a cord may be passed with safety where it might be  
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very improper and unsafe to make a deep incision.

But it is proper to observe, that there are some cases in which even a seton cannot be introduced : For a puncture sometimes runs in such a direction, as not to admit of a counter-opening. We must here trust to a proper application of pressure, not merely for preventing any lodgement of matter, but for producing adhesion of the divided parts ; and when this fails, injections of a moderate degree of astringency may be used with advantage : But as remedies of this kind tend to counteract the very intention for which setons are employed, they should never be advised till it appears that the latter will not succeed. Setons, as we have already observed, prove useful, by exciting inflammation along the course of a sinus. Now, one usual effect of astringent applications is, to diminish or even to remove inflammation. They should never therefore be employed till all the ordinary means of cure have failed, when

they may be used with a view to check the flow of matter when in too great quantities, and to induce some degree of callosity over the sides of the sore.

It is here proper to remark, that practitioners have differed much in opinion with respect to the use of astringent injections in wounds; for while some are in the daily habit of employing them, others have said that they are always pernicious, and ought never to be used. In the early stages of wounds they can never be necessary; and as they may do harm by washing away the matter too freely, they should never be used as long as a cure is expected, either by the formation of new granulations, or by adhesion: But whenever we have reason to conclude that this cannot properly happen, we may with propriety recommend them. Various forms of injection are mentioned by authors; but none of them are so harmless, and at the same time answer with such certainty, as weak saturnine solutions. Lime-water is used with the same views; and water strongly impregnated



pregnated with alum, or mixed with an equal quantity of claret or port-wine, is often employed with success.

In the treatment of punctured wounds where setons cannot be employed, it is sometimes difficult to prevent the external aperture from closing long before any tendency to heal appears in the bottom of the fore; and, if not prevented, much mischief is apt to ensue by matter collecting beneath, and bursting out from time to time. With a view to prevent this disagreeable occurrence, tents are employed of prepared sponge, gentian root, and other articles, that swell by the moisture of the sores, and thus serve very effectually to keep them open. But while they answer this purpose, they are very apt to do mischief. When the opening of a fore is plugged up with a tent, the matter can never be discharged but at the renewal of the dressings; by which means it will necessarily collect in such quantities as to give rise to absorption, as well as to the formation of sinuses, by the matter spreading between

the layers of the contiguous muscles. Tents, therefore, which are of solid materials, ought never to be of such magnitude as to fill the openings of fores. They will not readily do harm when of such a diameter as to admit of the matter being discharged while they are inserted. But when employed of such a size as to fill the openings entirely, they ought always to be hollow; by which the apertures into the fores will be prevented from contracting, while the matter will be discharged as quickly as it is formed. For this purpose practitioners should be provided with tubes of different forms and sizes, so as to be able to suit any aperture they meet with. Silver tubes are commonly employed; but those of lead answer better. Being softer than the others, they do not create so much uneasiness, and they are more readily made to take any particular shape, so as to answer for sinuses of a straight or crooked direction.

We must observe, however, that tents and tubes of every kind should be used with caution ; and it is more particularly necessary that this should be held forth to beginners, for there is no point in practice in which they are more apt to err. As they are early made sensible of the danger to be expected from matter collecting in fores, they very universally fly to the assistance of tents wherever a puncture or sinus is discovered. But it is right they should know that tents are seldom necessary : For when once a vent is given to matter, the opening will in general be preserved merely by the continuance of the discharge. In a few instances, indeed, it is otherwise ; and in all such cases the leaden tubes should be preferred.

We come now to speak of those wounds which are attended with laceration and contusion ; and as both of these circumstances require nearly the same method of treatment, it will not be necessary to speak of them in separate sections.

## SECTION IV.

*Of Lacerated and Contused Wounds.*

**A** WOUND is said to be lacerated, when the parts, instead of being divided with a sharp-cutting instrument, are forcibly torn asunder; and when, instead of a smooth equal surface, the edges are ragged and unequal: And we conclude, that contusion takes place when a wound has been made with a blunt or obtuse body.

Contused and lacerated wounds are in many circumstances essentially different from simple incised wounds; but in nothing more than in this, that while they are commonly more hazardous, they seldom at first exhibit such alarming appearances. Thus a simple cut, which commonly

commonly heals with ease, is often attended with a much greater retraction of the divided parts, and with more profuse hemorrhagy, than a contused or lacerated wound. It is a frequent effect indeed of contusion and laceration to prevent the effusion of blood, by which inattentive observers, in forming opinions of these wounds, are very apt to be deceived: For as hemorrhagy is the most alarming symptom with which wounds are attended, when it does not occur to any alarming extent, they are apt to conclude that nothing dangerous can ensue. Practitioners of experience, however, will not be deceived by this: For it has long been known, that injuries of this kind prove always more dangerous than other wounds; and that the more violent the contusion or laceration has been, the less blood is always poured out, insomuch that there are instances even of limbs being torn off without any hemorrhagy ensuing.

The pain of lacerated and contused wounds is not always in proportion to



the extent of the injury. Thus, in lesser contusions, the pain is often severe, while it is apt to be inconsiderable where the nerves of any part have been completely destroyed.

The immediate effect, both of laceration and contusion, is swelling or tumefaction in the retracted edges of the wound. This seems to be the consequence of effusion into the surrounding cellular substance. When the violence has not been severe, this effusion commonly terminates in supuration; the contused parts separate from those beneath in the form of sloughs; and a cure of the remaining sore is obtained by the means we pointed out when speaking of simple incised wounds. But when the parts are so much injured as to have their texture much destroyed, and especially when any of the larger arteries have been obliterated, there is always cause to suspect that mortification may ensue. In sound constitutions, and where the wound is not extensive, even this will not often prove fatal: For in such circumstances

cumstances the mortified parts commonly soon fall off, and a cure is accomplished in the usual manner. But in wounds attended with contusion or laceration to any considerable extent, if the habit of body is not perfectly good, the gangrene which ensues is always to be considered as hazardous : For the disease does not necessarily stop with the parts which have been injured ; but is apt to proceed to those which were not immediately hurt by the accident.

And again, even where mortification does not succeed immediately, when parts have been either much lacerated or contused, such a violent degree of inflammation often occurs as terminates in mortification, notwithstanding all our endeavours to prevent it ; and in whatever way the disease is induced, this proves always dangerous ; for besides the risk of parts immediately necessary for life being destroyed by it, the absorption of putrid matter from a gangrenous surface proves often suddenly fatal, even when the size  
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of the fore is so inconsiderable as to give no cause to suspect danger.

It is therefore obvious, that in the treatment of contused and lacerated wounds, our principal object is to guard against the accession of gangrene. But it is likewise clear, that this is not always to be done by the same means : For we may readily suppose, that much advantage may be derived from blood-letting, and other evacuations, where the injured parts are much inflamed, while no benefit would otherwise probably result from them. This, however, is a point of importance, and merits particular attention.

In lacerated or contused wounds, where the parts are much injured, it is the common practice to give large quantities of bark almost immediately, and to apply warm dressings and other antiseptics to prevent the accession of gangrene. It is evident, however, that the indiscriminate application of this practice must frequently do mischief : For however beneficial it  
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may be in particular cases, where gangrene has already taken place, it is certain that it will rather do harm where symptoms of inflammation still continue violent; and unless mortification actually exists, it is not clear that in any instance it ever proves useful; for although we have various proofs of the efficacy of bark in putting a stop to the progress of gangrene, I have never been sensible of any advantage being derived from it, when used as a preventative.

Gangrene may arise in these wounds from two causes: From the stoppage of the circulation by the total destruction of large blood-vessels; and from violent inflammation.

Gangrene proceeding from inflammation is here most to be dreaded; for that which arises from the destruction of blood-vessels is by no means frequent. The inflammation therefore which takes place in lacerated wounds, demands always our closest attention.

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As the hemorrhagy, subsequent to contusion or laceration, is seldom alarming, and as blood discharged from the injured vessels, tends more effectually than any other remedy to prevent inflammation; such quantities should be taken away in this manner as the nature of the wound may indicate, and the strength of the patient may admit. After this, if the divided arteries continue to throw out blood, they must be secured with ligatures; for till the discharge of blood is stopped, the patient will not consider himself as safe; nor can the wound be examined with accuracy. The parts are now to be cleared of all extraneous bodies, as far as this can be done with propriety, and are to be placed as much as possible in their natural situation; but no kind of future should be employed for their retention. If the violence done to them is considerable, and especially if accompanied with much pain, it will be still necessary to take blood in proportion to the strength of the patient; and the best method



thod of doing it is by means of leeches, applied as near as possible to the edges of the sore. Indeed no remedy I have employed proves so certainly useful in lacerated or contused wounds as the discharge of blood in this manner; for it not only tends to prevent the inflammatory symptoms from running high, but very commonly renders the pain moderate, even when it has previously been severe. It ought never therefore to be omitted; but the practitioner should take care that it be proportioned to the violence or urgency of the symptoms: For the discharge of a small quantity of blood will in some cases of contusion or laceration prove fully sufficient; while in others, it is necessary to repeat the operation once and again.

As soon as a sufficient quantity of blood is discharged, the parts affected, after being dressed with pledgits of any emollient ointment, should be completely covered with a warm emollient poultice; and this, together with warm fomentations, should be renewed three or four times a-day, so  
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as to promote, with as much certainty as possible, the formation of pus. To induce suppuration in lacerated wounds, is indeed an object of the first importance: It generally relieves all the symptoms; and till such time as it takes place, we have often reason to dread the event.

We commonly find, when fores of this description become covered with good pus, that the pain and tension abate; and such of the parts as have been much lacerated and contused, and which hitherto have been sloughy or perhaps black with mortification, begin now to separate from those beneath: And this being accomplished, they may in general be cured in the same manner with wounds of any other kind. Nay, when brought to this healing state, we may often attempt with safety to forward the cure by drawing the edges of the retracted skin into contact, either by means of the uniting bandage, or with adhesive plasters; for although this would be improper in the commencement of such wounds, while there is any risk of the tension

sion and inflammation proceeding too far, it may with much propriety be advised when there is no longer reason to be afraid of these symptoms.

When practitioners are immediately called, and have employed the means we have mentioned in due time, they will very commonly prove successful: But it frequently happens, whether from the violence of the injury, the tendency in some constitutions not only to inflammation but to gangrene, or from the proper remedies not being timeously applied, that all the symptoms become daily worse, and, notwithstanding repeated blood-lettings both general and local, all those parts which were at first inflamed become black and mortify. In this situation we do not trust to evacuations: On the contrary, whatever tends to debilitate should be avoided; and we know from experience, that in such circumstances, no remedies prove so useful as those which invigorate and restore the tone of the system.

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With this view, the patient should be desired to live upon nourishing food. He should be allowed as large a quantity as he can take, of good wine, or strong malt-liquor; and Peruvian bark should be given in as large doses, and these as frequently repeated, as his stomach will permit. Indeed bark is perhaps the only remedy on which we can place dependence; and as we know from experience that it may with safety be given in great quantities, it should always be exhibited without farther limitation than necessarily arises from the state of the stomach. We may remark, too, that it proves in general useful nearly in proportion to the quantity employed; and it often happens, that large doses are not more nauseated than those of not more than half the quantity. Where it is of importance to throw in a large quantity of bark in a short space of time, as is always the case in gangrene, it should never be given in less than doses of a dram, or even two drams, when the patient can bear it; and these should be repeated every

ry hour. Bark, in some cases, seems to prove more powerful when conjoined with the vitriolic acid: Elixir of vitriol may therefore be given along with it. In gangrene arising from debility, opium frequently proves useful; and as it does not counteract the bark, the two remedies may with safety be prescribed together.

In the mean time, the state of the fore requires particular attention. As long as any tendency prevails in the contiguous parts to inflammation, the best applications, perhaps, are warm emollient poultices and fomentations; for, as we have elsewhere shown, that the separation of mortified parts is commonly effected by the formation of matter between them and the adjoining sound parts, we necessarily derive most advantage from whatever tends to promote it\*. But as no suppuration will occur without some degree of inflammation, when there is no reason to imagine that this will otherwise happen,

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\* *Vide* Chap. I. where this subject is more fully considered.



we should endeavour to excite it by advising warm dressings to the sore, and especially by the application of stimulants to the contiguous parts. Mustard applied in the form of a poultice, as well as other rubefacients, have proved useful in this manner; and I have employed with advantage a strong solution of crude sal-ammoniac in vinegar and water. It is proper, however, to observe, that this practice must be managed with caution: For a high degree of inflammation might often prove detrimental, while in every instance it would be unnecessary; and we know from experience, that a small degree of it is sufficient. As soon, therefore, as it is observed that the mortified parts are surrounded with a kind of inflamed ring, the stimulating applications should be removed, in order to give place to warm emollients, for the purposes I have mentioned. Any parts that are completely mortified may with safety be removed; indeed the offensive smell which they produce renders  
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this a necessary measure: But as I have elsewhere observed, the common practice of making incisions through the diseased parts into those beneath which are still sound, should never be adopted. No advantage can be derived from it, and it may be productive of much harm. It is recommended with the view of giving more free access to ointments, and other remedies used as dressings, than could otherwise be obtained; but I have not in any instance seen it prove useful, and in different cases I have been sensible of its doing mischief. It may very readily carry the putrid matter of gangrene more deeply into the contiguous sound parts than it would otherwise penetrate. In some cases it has evidently induced more inflammation than was necessary; and in more instances than one I have known scarifications prove hurtful, by exciting very troublesome hemorrhagies.

By persisting in the use of bark, and the other remedies just mentioned, and especially if the strength of the patient is sup-

ported with wine and nourishing food, even bad cases of gangrene will often terminate happily; the mortified parts will separate, and the remaining fore will heal kindly and easily with common mild dressings: But in other instances, notwithstanding all our endeavours, the disease will continue to spread, and nothing will prevent its fatal termination. When gangrene is seated in any of the extremities, it is the common practice, when other means of cure fail, and when mortification is still advancing, to amputate above the diseased parts: We have elsewhere shown, however, that this practice should not be adopted; and when treating of amputation, we shall again have occasion to consider the subject more particularly.

In the treatment of mortification, it is a good general rule to advise evacuations of every kind with much caution. This is particularly the case with respect to blood-letting; but in addition to what I have already observed, I think it right to remark, that in all cases of inflammation  
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where the approach of gangrene is dreaded, and particularly in wounds attended with much contusion or laceration, till mortification actually occurs, we should proceed with freedom in an antiphlogistic course, particularly in discharging as much blood as the degree of inflammation may appear to render necessary; and I insist on this point the more fully, from having often observed much mischief ensue from practitioners being too timid in advising it. Being afraid of sinking the patient too much, they avoid the only remedy that could probably save him: For, in such circumstances, it is the violence of the inflammation of which we have most reason to be afraid; and as we know of no remedy which can with such certainty be depended upon for removing inflammation as blood-letting, it should be prescribed with as much freedom as the strength of the patient and other circumstances of the case will permit; by which the accession of gangrene will often be

prevented when all the usual remedies would probably fail.

What we have hitherto said in this and the preceding sections, may be considered as common to wounds in general: We now proceed to consider those wounds, which, either from the nature of the part wounded, or from its situation, demand a peculiar treatment.

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## SECTION V.

*Of Wounds in the Veins.*

**I**T is for the most part difficult to restrain hemorrhagies from wounded arteries, on account of the force with which the blood is propelled into them by the heart, and on account of their muscular coats, which prevent them from collapsing readily. But in the veins neither of these circumstances take place; the contractile power with which they are endowed is very inconsiderable; and we do not perceive that the circulation in them is much affected by the action of the heart.

For these reasons, wounds in the veins heal with more ease and are attended with less danger than wounds of the arteries: Indeed we know, that the largest veins are often much injured, and that no bad symptom will ensue; while very trouble-

some consequences will follow from wounds even of small arteries. In general, therefore, we have no great reason to be afraid of wounds in the veins: For while we have it in our power to check the hemorrhagy, we never observe any detriment to ensue even from the obliteration of the largest external veins; for the anastomising branches so readily admit of dilatation, that they soon become sufficient for carrying on the circulation beyond the parts affected.

We commonly find, that a longitudinal cut in a vein heals with ease when only slightly covered with a piece of dry lint or soft old linen: When this fails, the hemorrhagy may be always stopped by the application of a piece of dry sponge or agaric to the bleeding orifice, and securing it with moderate pressure. But in transverse cuts in the large veins, or when any of them are cut entirely across, it may sometimes happen either that pressure cannot be properly applied to the wound, or that it does not prove sufficient

cient for stopping the discharge : In such cases escharotics are commonly advised, and by some practitioners the actual cautery is employed ; but none of these can be depended on ; and they are apt to create a good deal of uneasiness. The same remedy therefore should be employed here that we daily use in hemorrhagy from wounds in the arteries, namely, ligatures ; which, when properly applied, neither fail in their effects, nor produce any material inconveniency. In the application of ligatures, we have elsewhere shown, that the crooked needle should seldom or never be used, and that the tenaculum alone should be employed.

## SECTION VI.

*Of Wounds in the Lymphatics.*

**T**HE lymphatics are equally liable to injuries with other parts of the body : As they often lie contiguous to veins, they are sometimes wounded in the operation of blood-letting ; and not unfrequently they are cut in opening buboes and other glandular collections of matter.

When the smaller branches only of lymphatics are opened, we may readily suppose that they will heal along with the rest of the wound ; but a wounded lymphatic is sometimes so large, that it does not heal so soon as the other parts, but continues to pour out its contents in considerable quantity, thus giving a good deal of inconveniency, while at the same time it weakens the patient : We should  
never

never hesitate therefore in putting a stop to the discharge.

Various means have been proposed for effecting this. In some cases it has been done by compression alone: Astringents have been advised, together with the application of dry sponge, agaric, and common puff-ball; and both the actual and potential cauteries have been used. But when moderate pressure fails, our most effectual remedy is to take up the injured lymphatic with a ligature, in the same manner as we do wounded arteries. No objection can be made to this; and it answers the purpose in the most certain manner.



## SECTION VII.

*Of Wounds in the Nerves and Tendons, and  
Ruptures of the Tendons.*

**I**N a preceding part of this chapter, I had occasion to speak of the consequences which sometimes result from the partial division of nerves and tendons, and of the means which seem to be best adapted for removing them. When treating of blood-letting, I shall again find it necessary to enter upon the same subject, so that our observations to be made upon it at present will not be numerous.

It must often happen, that nerves and tendons are partially divided along with other parts; but when no pain ensues from it, this accident does not particularly come under the observation of practitioners. In such cases they heal along with the other parts of the wound: But

in various instances, either from some singular degree of irritability in the injured parts, or from a peculiarity of constitution which we cannot explain, the slightest puncture of a nerve or of a tendon, will induce very severe pain, inflammation, convulsions, and even death.

Whenever we have reason to suspect, from the violence of the pain, that the other symptoms may supervene, the most effectual means should be immediately used for preventing them: For when once convulsions take place, we are never certain of being able to allay them. In some cases, large doses of opiates answer the purpose: But when they do not very quickly prove successful, no time should be lost in putting the only remedy in practice, on which we can place much dependence; and that is, the complete division of the injured nerve or tendon. By this we may indeed induce a certain degree of insensibility in the parts beneath, or they may even be deprived of the power of voluntary motion: But any  
inconvenience

inconvenience which this may occasion will be trifling, when compared with the advantages which result from the operation : For I can from experience assert, that it seldom fails in removing all the symptoms, when timeously employed ; while in various instances, wounds of this kind have terminated in death where it has been omitted.

In this manner we may obviate the effect of punctures and partial wounds, either in nerves or tendons : But it is necessary to mention the method of treatment to be pursued in the healing of wounds or ruptures of large tendons, when completely divided. As a complete division of any of the large tendons is always attended with much retraction, it was long ago inculcated by practitioners, to draw the retracted extremities of the ruptured tendon into contact, and to retain them in this situation by sutures : And this being done, and the limb placed in a favourable situation, the rest of the fore was treated in the usual way.

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There is no reason to doubt of cures having been often accomplished in this manner: Nay, where tendons have been merely ruptured, without any external wound, as often happens with the tendo Achillis, the retracted ends of the tendon have been laid bare by an incision, for the very purpose of retaining them by futures. This, however, is a very painful operation; and as the same intention may be accomplished in a more simple manner, it ought to be laid aside. When it was first proposed to unite ruptured or wounded tendons by means of futures, it was the common opinion, that, in order to insure a reunion of the divided parts, it was absolutely necessary to bring them into close contact; and the same idea prevailed, not merely with respect to tendons, but with regard to bones, as well as other parts.

In the treatment of fractured bones and ruptured tendons, it is no doubt a right general rule to endeavour to bring the divided parts as nearly into contact

as

as possible: But we now know that cures may be accomplished where the retraction of parts is so considerable as to render it impossible to draw them together; nay, that it has often been done, even where a portion of a tendon or of a bone has been completely removed. Very considerable portions of bone have been regenerated; and although we are not certain that any part of a tendon has ever been renewed, yet such adhesions always take place between the retracted ends of the divided tendon and contiguous parts, as tend in a great measure to supply the deficiency. Thus I have known different instances of the tendon of the rotula being ruptured, as well as of the tendo Achillis: And although the ends of the retracted tendons could never be brought within an inch of each other; yet in all of them where proper attention was given, the cures have been so far complete, that the use of the limbs has been very perfectly restored. Some degree of stiffness has often indeed remained for a considerable time;



time ; but at last even this symptom has very commonly been removed.

Wherever a wounded tendon is situated, or even when a tendon is only ruptured, and no injury done to the external parts, the limb should be placed in such a manner as will most readily admit of the retracted ends of the tendon being brought nearly together ; and when in this situation, the muscles of the whole limb in which the injury has happened, must be tied down with a roller in such a way as to prevent them from being exerted in any way during the cure, at the same time that the parts should be placed in such a position as will tend most effectually to keep them easy and relaxed. Thus, in a wound or rupture of the tendon of the rectus muscle of the thigh, the patient's leg should be kept as much as possible stretched out during the cure, and the thigh should be in some degree bent, or elevated into an angle with the body, so as to relax the muscle itself as far as it can be done, while

in similar affections of the tendo Achillis, the knee should be kept bent, so as to relax the muscles of the leg; at the same time that the foot should be stretched out, so as to admit of the ends of the ruptured tendon being brought nearly into contact. In applying a roller to secure the muscles and tendons in this situation, it should be done with a firmness sufficient for the purpose, at the same time that care should be taken to prevent it from impeding the circulation: With this view, fine soft flannel should be preferred to linen or cotton: For being more elastic, it more readily yields to any swelling with which the limb may be attacked.

The late Dr Monro was the first who gave accurate directions for treating a rupture of the large tendons; and he has probably done it with the more precision, from having himself experienced the effects of this misfortune in the tendo Achillis. As the method which he points out, and the instruments which he recommends,

mends, are simple and judicious, and as they have in various instances been found to answer the purpose, a description of them will be considered as a proper addition to this article.

The different instruments used by Dr Monro, with the several parts of each of them, are represented in Plate II.

Fig. 9. Is a foot-sock or slipper, A, of double quilted ticken; from the heel of which, B, the quilted strap, D, is of such a length as to reach above the calf of the leg.

Fig. 1. A strong quilted calf-piece, E, with pye-holes, FF, on each side, through which a lace, fig. 2. is to be passed, and with a buckle, G, so placed on its back-part, that when the lacing is on the outside of the leg, the buckle will be in the middle of the lower part. Two rows of pye-holes are here represented, one on each side; either of which may be used according to the size of the leg.

In Dr Monro's case, the foot and leg were first wrapped in soft flannel smoaked

with fumes of benzoin, when he put on, as in fig. 3. the foot-sock A, and calf-piece E; and bringing the strap H thro' the buckle G, he could by it extend the foot, and pull down the calf to what degree might be judged proper, and there it was secured with the buckle.

This bandage answered the intention perfectly well; and it was worn night and day. It should be drawn tighter during sleep, and relaxed when the patient is awake, and on his guard; during which the foot should be placed upon a stool, as at I; and the calf-piece should be frequently stuffed, or made easier by loosening the lace so as to prevent the foot from swelling, which is apt to happen, if this is omitted. To prevent the toes from becoming uneasy, the foot-sock should be left open at the end K.

During the first fortnight the Doctor made no motion or effort with his foot, but was carried in a chair, running on castors, from one part of his house to another: After this he began to move the  
foot

foot backwards and forwards, so gently as not to give pain. In a gradual manner the motions were increased; the extension of the leg and flexion of the foot were always stopped on their producing any uneasiness.

On beginning to walk, the affected leg, which was the left, was always put before the right, so that the left foot might be as well extended as possible. To prevent any danger from falling, a cane was used in the right hand.

The void between the two ends of the divided tendon became insensible in a few days, except that a softness was felt there more than any where else; but this part turned gradually thicker and harder, till a knot was formed in it of the size of a middle-sized plum. At first this tumor was equally hard with a piece of cartilage; but it gradually became softer, and diminished so much, that at last it was scarcely perceptible.

With a view to strengthen the leg and foot, cold water was poured upon them,



and immediately thereafter they were well rubbed. This was first employed some weeks after the accident: But no advantage being derived from it, the parts were afterwards strongly rubbed twice a-day with unguentum altheæ, or some other emollient; and this was continued till the limb could be used with freedom.

In about two weeks from the time of receiving the injury, the Doctor was obliged to go abroad, when he used a pair of shoes with heels two inches high, and applied the machine, which we shall presently describe, through the day, instead of the former bandage; which, however, was always put on at night for a month longer.

This machine, fig. 8. is a piece of steel, the middle stalk of which, L, is narrow but strong; the ends, MM, are thin and concave, and must be adapted to the convexity of the foot and forepart of the leg. Three staples, *a, a, a*, stand

stand up from the fore-part of the steel ; one in the middle of each of the broad ends, and the third in the middle of the stalk. All the steel, except the stalk, should be covered with soft leather, and the concavities of M M should be well buffed, as the softer rupture-bandages commonly are.

After putting on the shoes and stockings, one end of this machine was put upon the broad part of the foot, nearer the toes than the buckle of the shoe, and the other end placed upon the fore part of the leg ; then one ribband, or a thong of leather, fig. 5. was put round the foot, and another, fig. 6. round the leg, to pass through the two staples near the ends of the machine, and there secured with straps or buckles, but without being drawn tight. A third strap or ribband, fig. 7. with its middle, N, applied to the hollow of the foot immediately before the heel, had its ends passed on each side of the foot through a

noose, *oo*, of a fourth thong of leather, *P*, that came round the quarter-heel of the shoe, to be afterwards put through the middle staple; where, after these ends, *q q*, were drawn as tight as was thought convenient for extending the foot, they were secured with the buckle or with knots. See the application of this machine in figure 4.

This was continued for the space of five months; but those who may find it inconvenient, might use instead of it a thong of leather, sewed at one end to the upper and middle part of the quarter-heel of the shoe, and fastened at the other end to a garter or strap put above the calf of the leg. The high-heeled shoes were continued for a considerable time: Two years elapsed before they were thrown aside; by which means, and by treating the injured limb during all that period with great caution, a very complete cure was obtained; while others, who have not been so attentive to  
the

the management of matters of this kind, have not been so fortunate; some of them having the tendon ruptured a second, or even a third time, and others remaining stiff and lame for a great length of time.

SECT.

## SECTION VIII.

*Of Wounds in the Ligaments.*

**B**Y Ligaments, we understand those flexible bodies which serve to cover the different articulations, and by which many of the bones are firmly tied to each other. The bones of the pelvis are united by strong ligaments; and we know, that several other bones are chiefly connected by the same means. But as all these ligaments lie deep, they are not much exposed to the effects of external violence; and the same cause puts it out of our power to apply any particular treatment for injuries which may accidentally be done to them. Our observations at present are therefore chiefly applicable to wounds of the ligaments of joints,



joints, commonly termed Capsular Ligaments.

As ligaments are not so plentifully supplied with nerves as some other parts of the body, several anatomists have been induced to believe that they are not possessed of sensibility; by which we might be led to conclude, that injuries done to them would not probably require much attention: But although Nature, for obvious reasons, has not made the ligaments highly sensible; and although in a healthy state they will bear much fatigue, without suffering so much as other parts of the body; yet the fact is undoubted, that they are rendered extremely sensible by disease; and that wounds inflicted on them are frequently productive of very alarming consequences. We have often indeed known the ligaments of joints much injured, nay violently lacerated, with the heads of the bones which they surround being pushed through them, as well as by other causes, without any important consequences taking

king place ; nay, in some cases, the wounds have healed as easily as if the ligaments had not been affected. Occurrences of this kind, however, are rare ; for in a great proportion of cases, the symptoms which ensue from wounds of the joints are severe and hazardous.

The effects produced by this kind of injury are often deceitful : In general nothing alarming appears at first, nor for several days after the accident ; and when the patient is treated with care and attention, I have known a week pass over before any other symptom has been observed than usually takes place in the most simple wounds. But, at length, the patient begins to feel an uneasy sensation of stiffness over the affected joint, which by degrees turns more severe ; when the parts become swelled, tense, and somewhat inflamed. In this situation the pain is often so severe, that the patient cannot allow the joint to be touched : He complains of a tightness round the whole, as if it was firmly tied or girded ; and the inflammation,

inflammation, which at first was confined to the joint itself, is now apt to spread over the whole limb.

If the wound or laceration in the capsular ligament is large, the synovia is often discharged in considerable quantities at first; but the swelling induced by the inflammation gradually puts a stop to this, till at last the wound becomes dry and sloughy. In the course of a few days, however, extensive suppurations begin to form over the joint; and on these being laid open, large quantities of pus are discharged, together with synovia. By this the tension and sensation of girding are immediately removed, and the patient obtains relief; but successive suppurations commonly take place, which from time to time excite a renewal of all the symptoms, and by which the patient's health is at last greatly injured.

When wounds of ligaments do not heal quickly, and almost without the formation of matter, this is in general the manner in which they terminate; at least it  
is

is the case in the larger joints, and it is in these chiefly that they commonly prove alarming.

From this history of the rise and progress of the symptoms, some advantage may be derived in conducting the cure. From this it is evident, that it is not merely the injury done to the ligament which we have to dread, but a secondary train of symptoms, which are apt to result from it. Although none of the lining membranes of cavities, which are naturally shut up from the air, seem to be endowed with much sensibility, it seems to be a common effect of air being admitted to give them a high degree of it. Of this we have frequent proofs in wounds penetrating the thorax and abdomen; and it is chiefly to this cause that we are to attribute those consequences which result from wounds in the capsular ligaments of joints.

This points out a very important circumstance in the treatment of these wounds, namely, the prevention, as far as is in our power, of air finding access  
to

to the cavities of capsular ligaments. In large lacerated wounds, this will, for the most part, be impracticable; but in common incised wounds, it may often be very completely effected.

It ought never to be attempted, till we are certain that all extraneous bodies that have been carried in are extracted. This being accomplished, we may very commonly cover the wound in the capsular ligament entirely, by pulling the skin so far over it, that the wound in the one may not correspond with that in the other; and as the skin about the joints is sufficiently lax to admit of this, it may for the most part be easily done. We are now to fix the skin in such a manner that it may not retract, either with sutures or adhesive plasters: But in general the latter will prove sufficient, if assisted by the application of a proper bandage; and they are preferable to sutures, which in this situation are apt to excite inflammation. After the plasters are applied, the skin and cellular substance should  
be



be supported in their situation by passing a flannel roller spirally round the joint, so as to produce an equal degree of compression over it, of a tightness sufficient for gently compressing the parts to which it is applied without interrupting the circulation. The patient should be in bed while the dressings are applied, so that they may not afterwards be liable to be moved; and the limb should be put upon a pillow, and placed in such a situation as admits of the skin and other teguments being completely relaxed, which will be found to be different in different parts even of the same joint. Thus, in wounds on the anterior part of the knee, the leg should be kept extended during the whole progress of the cure; for in this situation the skin which covers the fore part of the joint is most effectually relaxed; while, for a similar reason, in penetrating wounds entering from the ham, the leg should be kept bent.

In

In the mean time, in order to prevent the accession of inflammation, the patient should be put upon a low diet ; his bowels should be kept open ; a moderate perspiration should be excited ; and he should lose a quantity of blood suited to his age and strength.

By wounds of the joints being treated with this strict attention, I have known many of them terminate easily, which otherwise, there was cause to think, would have produced both distress and danger. But when these means do not prove effectual, or when too long neglected, so as that the application of them is no longer admissible, and which is the case when inflammation has taken place, other remedies must of course be employed.

In this situation, our chief object is to lessen or remove the inflammation ; for if not speedily accomplished, it will in all probability spread over the whole joint, and terminate in an extensive formation of matter ; and this being always hazardous, nothing should be omitted by

which it can probably be prevented. The most effectual remedy which I have ever employed for this is local blood-letting; but, in order to prove useful, it must be carried to a considerable length. In strong robust patients, eighteen or twenty leeches should be applied as near to the part affected as they will bite, and repeated daily as long as the continuance of the inflammation may render it necessary. Any of the simple ointments may be applied to the wound itself; but one of the best applications to the joint is the steams of warm vinegar, which prove often useful in preventing the formation of matter. And as the pain in wounds of the joints is in general severe, large doses of opiates must be given to allay it. In a few cases, I have known the pain much relieved by the external application of a strong decoction of white popy heads, in the form of fomentation: But for the most part nothing proves effectual but the internal use of opium.

A due attention to these means will commonly prove effectual, if they have not been either too long neglected or too sparingly administered. From either of these causes, however; from the injury having been particularly severe; or from some constitutional affection; the inflammation will in some cases still proceed to increase; and, notwithstanding all our endeavours, will at last terminate in very large collections of matter, which will be partly within the capsular ligament of the joint, partly in the substance of the ligament itself, and in part will be found to have spread through the cellular substance of the contiguous parts. In such circumstances, all that we can do is to give free vent to any matter that may form; which can only be done by making an opening in the most depending part of the collection as soon as the existence of pus is ascertained. In this manner, and by a proper use of emollient poultices and fomentations, whenever a new collection appears to be forming, we  
will

will often be able to save limbs, which otherwise it would be necessary to amputate: But all who have had experience in this branch of practice will know, that when wounds in any of the larger joints terminate in suppuration within the capsular ligaments, that the risk attending them is great; and that we can never, even under the best management, have any dependence on their terminating favourably. The principal reason, as I have already observed, of their continuing obstinate, is the inflammation becoming violent; which when not obviated by the means advised above, is apt to produce such large collections of matter; and one abscess is so apt to succeed to another, that the patient is at last exhausted, when we are often under the necessity of removing the limb in order to save his life. In such circumstances, indeed, there is no room to hesitate; for when the strength is much impaired by the frequent formation of abscesses, if the same disposition continues, and especially



cially if any degree of hectic fever has taken place, the risk attending any attempt to save the limb will now be considerable, while the chance of succeeding will be so small, that it should never be advised.

But although I am decidedly of opinion, in circumstances such as we are considering, that it is the safest course to amputate the limb; yet I by no means agree with those who say, that almost every case of a wounded joint requires the same remedy. By many it has been asserted that wounds in any of the larger joints almost universally terminate so unfavourably, that, in order to save much pain and trouble, as well as risk to the patient, it would be the most advisable practice to amputate immediately after the accident, before there could be any chance of inflammation taking place. I am convinced, however, that this opinion is founded in error; and my reasons for it are these:

Although

Although a complete cure is not often obtained where the capsular ligaments of large joints are extensively wounded, yet in some cases it is otherwise. Of this I have met with various instances : And although such injuries will not often be so effectually cured as to prevent a good deal of stiffness and immobility in the joints in which they are seated ; yet even a complete ankylosis is an inconvenience to which a patient should in most cases submit, rather than to the pain and hazard which uniformly attend the amputation of any of the extremities.

As it must be admitted, however, that the proportion of limbs saved by this practice is not great, when the injury done to the capsular ligaments of joints is extensive, this argument would not deserve our attention, if the delay which it occasions were to be attended with any additional hazard, or if it should preclude amputation, if at any future period of the fore it might be judged advisable. This indeed has been alleged by practitioners : But  
there

there is much cause to suspect that they are wrong; for many who have been accustomed to amputate in the late stages of these wounds, have had more success than usually attends the practice immediately after the injury is inflicted. And this, in the course of my experience, has been so uniformly the case, that scarcely any have died who were not previously so very much reduced as to render their chance of recovering very small indeed; a situation which we have it always in our power to guard against, by advising the operation before matters are so far advanced.

Where the capsular ligament of a joint has not only been wounded, but much lacerated and contused, it may, in a few cases, be proper to advise immediate amputation. But such instances are extremely rare; in so much, that I have scarcely met with any, excepting where the ends of bones have been perhaps much shattered, and even splintered, at the same time. Where this has not been the case,

case, I have uniformly attempted to save the limb ; and as in many instances the practice has succeeded, and without adding to the risk of the patient where the trials have failed, I shall certainly think it right to continue it.

END OF VOLUME FIRST.

